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PC INTERFACE

User's Guide



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GN00100-01.REV00
April 1986

Version 2.7

Locus Computing Corporation

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GN00100-01.REV00, Initial Printing, April 1986, 2500

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Printed in U.S.A.



About This Book

This manual explains how to use your IBM or IBM-compatible personal computer with either the 3Com EtherLink board or an asynchronous communications adapter and the PC-Interface software.

The PC-Interface software allows you to:

- Integrate your personal computer into your existing UNIX host computer network.
- Use the file services of a UNIX host while running DOS applications as if the host were a colocated fixed disk.
- Conduct a standard UNIX session from your personal computer.

Throughout this manual, the term "personal computer" refers to the IBM Personal Computer, the IBM Personal Computer XT, the IBM Personal Computer AT, or other compatible computer. The term "DOS" refers to the Microsoft Disk Operating System program (version 2.0 or later). The term "UNIX" refers to the UNIX 4.2 BSD, UNIX System V, or XENIX System V operating systems.

Helpful Features

A reference card is provided with this manual, summarizing the PC-Interface commands and the terminal emulation keyboard uses.

There are also several System Change Request postcards in the back of the manual. You can use these cards to report

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problems with the software or the documentation or to suggest enhancements to PC-Interface.

Who Should Use This Manual

This manual is for anyone using PC-Interface with a personal computer to take advantage of information or services that exist in a UNIX host environment.

You should have a general knowledge of MS-DOS, Version 2.0 (or later), and be familiar with the communications for your UNIX host computer system.

Experienced DOS and UNIX users who want more information about the structure of PC-Interface and users responsible for installing and administering PC-Interface software on the UNIX host should refer to the *PC-Interface Administrator's Guide* for the applicable UNIX host.

Organization of This Manual

This manual has five chapters and three appendices as follows:

Chapter 1. Introduction acquaints you with the PC-Interface software and the configuration requirements for your personal computer.

Chapter 2. Using Host File Services tells you how to establish communications with your UNIX host and to run DOS applications using the host as a large fixed disk.

Chapter 3. Using Your Computer as a UNIX Terminal describes the terminal emulation features of PC-Interface.

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Chapter 4. Tailoring PC-Interface gives you some tips and ideas for modifying your PC-Interface installation to better suit the way *you* use the programs.

Chapter 5. Command Summary provides a quick reference for all the PC-Interface commands discussed elsewhere in this manual.

Appendix A. Installing PC-Interface provides instructions for merging the PC-Interface software with DOS to create a working version of PC-Interface.

Appendix B. Messages explains all the messages you might receive from PC-Interface.

Appendix C. Using a Dial-Up Modem tells you how to establish a host connection using a dial-up modem.

Related Publications

PC-Interface Administrator's Guide for UNIX 4.2 BSD, Locus Computing Corporation, 1986.

PC-Interface Administrator's Guide for UNIX System V, Locus Computing Corporation, 1986.

PC-Interface Administrator's Guide for XENIX System V, Locus Computing Corporation, 1986.

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Appendix A. Installing PC-Interface

Appendix B. Messages

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PC-Interface

The PC-Interface software package allows you to bridge the gap between your personal computer and UNIX hosts.[1] With PC-Interface and an Ethernet or asynchronous connection to a UNIX host, you can run DOS applications using data from the UNIX file system. You can store files and even DOS applications on the UNIX host and access them just as if they were on a local fixed disk. By taking advantage of the increased storage capacity of the UNIX file system, your personal computer without a fixed disk can operate as efficiently as a personal computer with a fixed disk.

When you use the host file services of PC-Interface, the file security capabilities of UNIX allow you to share files throughout a personal computer network while protecting your files from unauthorized access. You can also take advantage of shared host resources, such as a laser printer.

PC-Interface can also emulate a VT-100 terminal, allowing you to conduct a regular UNIX session. Because PC-Interface's emulator blocks data for input and output efficiently, screen refreshing activities can be faster and load on the host can be less than running the same task on a conventional terminal.

For all its power, PC-Interface is remarkably simple to use. DOS users need to know nothing about UNIX to use host file services. Just treat the UNIX system as an enhanced disk drive connected directly to your personal computer. Users familiar with DOS and UNIX can combine host file services and terminal emulation, toggling back and forth between the two modes. For example, you could create a text file in host

[1] The term "UNIX" includes UNIX 4.2 BSD, UNIX System V, and XENIX System V.

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file services mode using a DOS word-processing package, then switch to terminal emulation mode to include that file in a UNIX mail message.

Minimum Requirements

To use the PC-Interface software, you must have the following:

Personal Computer

- An IBM Personal Computer, IBM Personal Computer XT, IBM Personal Computer AT, or other compatible personal computer.
- 128K bytes of memory. (For practical use, however, we recommend a minimum of 256K.)
- One 320K-byte (double-sided) diskette drive.
- A monochrome display with a monochrome display and printer adapter or a color display with a color/graphics monitor adapter.
- PC-DOS or MS-DOS, Version 2.0 or later.
- The 3Com EtherLink board or an asynchronous communications adapter.

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Host

Your personal computer must be attached via Ethernet or an RS-232 connection to a host system running UNIX 4.2 BSD, UNIX System V, or XENIX System V. The UNIX modules for PC-Interface must already be installed on this host.

Installation of Adapter

The 3Com EtherLink board can be installed in any full-size system unit expansion slot of the personal computer following the instructions in the *3Com EtherLink Installation Guide.*

Normally, the 3Com EtherLink board should be configured to use interrupt channel 3 (the COM2 port). If you cannot use interrupt channel 3, you must use interrupt channel 5 and modify the PCIINIT command as described in Appendix A.

To use the 3Com EtherLink board with the on-board transceiver, set the transceiver select switch to BNC and attach thin coaxial cable to the BNC coaxial cable connector on the rear panel of the board. To use the board with an external transceiver, set the transceiver select switch to DIX and attach the Ethernet transceiver cable to the 15-pin connector on the rear panel of the board.

An asynchronous communication adapter can be installed in any full-size system unit expansion slot of your personal computer following the instructions in the *Technical Reference Manual* for your personal computer or in the product manual for the adapter.

An RS-232 cable connects the adapter to the UNIX host.

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Installing PC-Interface

The plastic jacket at the back of this book contains your PC-Interface distribution diskette. To use PC-Interface, you must first create a working diskette that combines the PC-Interface programs with the DOS files needed to "boot" your personal computer and load PC-Interface. (If you have a personal computer with a fixed-disk drive, you must install PC-Interface so that it is automatically initialized when you boot your personal computer.)

The PC-Interface distribution diskette contains an installation program called MKDISK to simplify this process. Before reading further, you should follow the instructions in Appendix A, Installing PC-Interface.

Chapters 2 and 3 of this manual assume that you have created a full working diskette exactly as described in Appendix A.

Copy Protection

The PC-Interface software is copy-protected. Although you may make copies for your personal use, you cannot use two copies at the same time. When the UNIX host detects two simultaneous sessions from the same distribution diskette, it disables the session on the personal computer of the user who logged in last. This may happen some time after the second user has logged in and begun working.

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Compatibility

Most popular DOS application software products operate with PC- Interface, including the following:

- Lotus 1-2-3, Release 1A, Lotus Development Corporation
- Framework 1.0, Aston-Tate
- WordStar, MicroPro International Corporation
- Basic 2.0, 2.1, and 3.0, IBM Corporation
- Symphony 1.01, Lotus Development Corporation
- Multiplan 1.10, Microsoft Corporation
- VisiCalc IV, Release 2.0, VisiCorp
- Macro Assembler 3.00, Microsoft Corporation
- dBase II, Version 2.4, Ashton-Tate
- dBase III, Version 1.1, Ashton-Tate
- pfs:FILE, Software Publishing Company
- MultiMate, SoftWord Systems, Inc.

Other DOS application software products may operate with PC- Interface if they do not:

- Overlay the DOS or BIOS area of storage.
- Program the 8259 interrupt controller in a way that interferes with PC-Interface's use of that controller.
- Disable interrupts, fail to issue an end-of-interrupt or IRET on a hardware interrupt level, or mask selected interrupt levels for more than 100 milliseconds.
- Use interrupts 13, 25, or 26 for access to the virtual disk.
- Configure hardware device registers that belong to the network hardware used by PC-Interface.

 Make incorrect use of timer interrupts.

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- Open more than 127 files (that is, require the presence in the CONFIG.SYS file of a FILES= command with a value greater than 127).

This list of limitations for concurrent operation may not be complete.

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Introduction

PC-Interface lets you interact with a UNIX host in either of two ways:

- Your personal computer can use the file services of the host while running DOS applications as if the host were a colocated fixed disk.
- Your personal computer can emulate an VT-100 terminal, enabling you to conduct a standard UNIX host session.

You can work entirely in one mode or the other or you can switch back and forth between them.

This chapter tells you how to use host file services, including:

- Beginning and ending a host file services session.
- Handling differences between DOS and UNIX file naming conventions.
- Converting text files between DOS and UNIX formats.
- Using UNIX file permission modes to protect your files in a multiuser environment.
- Executing UNIX processes from DOS.
- Printing files on either a remote or local printer.

Chapter 3 describes using terminal emulation.

The procedures described in this chapter and the examples shown assume that PC-Interface has been installed for your personal computer as described in Appendix A.

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Beginning A File Services Session

The following procedure starts a file services session. This allows you to run DOS applications, using and storing files on the host as if it were a local fixed disk.

1. If you are using a diskette, insert your PC-Interface working diskette in drive A: and close the drive door. If you are using a fixed disk, leave the drive A: door open.

2. Switch ON your personal computer, if you have not already done so. If the system unit is already on, press and hold the CTRL and ALT keys; then press the DEL key.

 The following message appears:[1]

   ```
   PC-Interface Release 2.7.4 (Serial #x.xxxx) Initialized
   ```

 Following this message, you may see the commands from the AUTOEXEC.BAT file as they are executed.

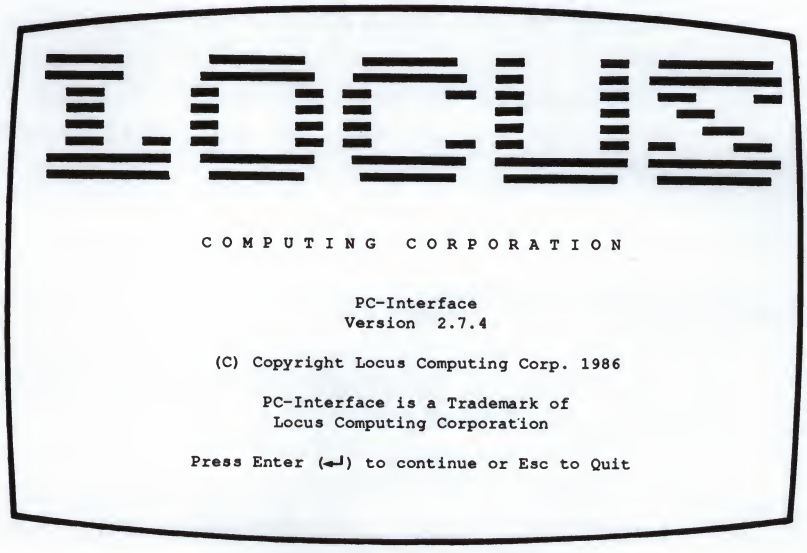
3. In response to the system prompt (A> if you are using a diskette; C> if you are using a fixed disk), type:

   ```
   login
   ```

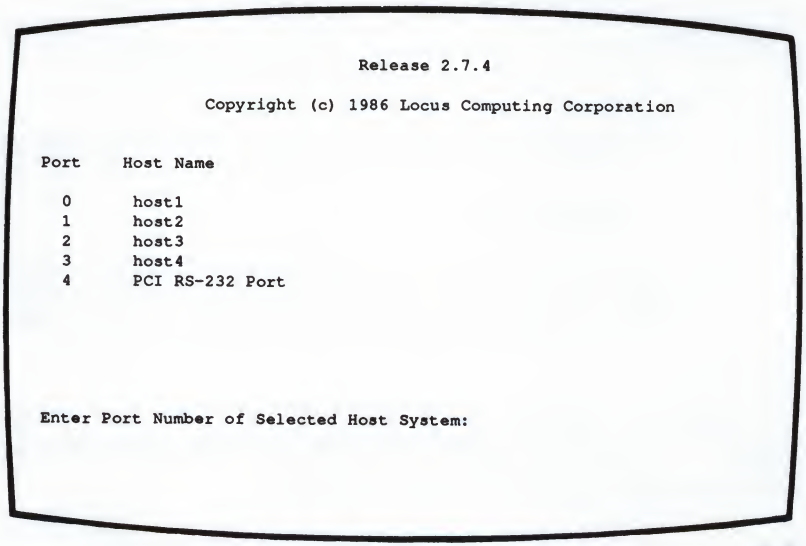
[1] Depending on other software that may be installed for your personal computer, you might see other messages first.

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Press Enter (↵). The PC-Interface logo screen appears:



4. Press Enter (↵) to continue. The PC-Interface host menu screen appears:



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The PC-Interface host menu screen shows you the UNIX host connection paths available to you. When your personal computer is connected to one or more hosts over Ethernet, the host names appear on the menu. When your personal computer is connected to a host over an RS-232 connection path, the words PCI-RS232 Port appear on the menu. You may have one or more choices on your menu screen.

Logging In Over Ethernet

Use the following procedure to choose a UNIX host connection over Ethernet.

1. In response to the host-selection prompt, type the port number that appears on the menu next to the host name and press Enter (↵).[1]

 A connection-attempt message replaces the host-selection prompt, briefly, and is replaced by the following prompt:

   ```
   Username:
   ```

2. Type your UNIX user name and press Enter (↵).

 PC-Interface prompts you for your password as follows:

   ```
   Password:
   ```

3. Type your UNIX user password and press Enter (↵). The characters you type do not appear on the screen, thus

[1] PC-Interface continues to prompt you until you enter a valid port number. If the host you want is not available and you want to return to DOS, press and hold the CTRL key and type C.

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protecting the security of your password.

PC-Interface attempts to establish a connection to the UNIX host you selected. If your user name or password was entered incorrectly and PC-Interface cannot establish a connection, it displays the following message on your screen:

```
Login Incorrect
Try Again? (y or n):
```

When you type `y`, PC-Interface reprompts you for your user name and password. When you type `n`, PC-Interface returns you to DOS, and you receive the DOS operating system prompt. (**Note**: Do not press Enter after the `y` or `n`).

4. When the connection is established, the following message appears on your screen:[1]

```
Welcome to PC-Interface.
Unix File System Available as Drive C:
A>
```

Logging In From The Command Line

To save time, you can bypass the PC-Interface logo screen and the host menu selection screen when you log in over Ethernet.

[1] Note that the drive specifier you see might be different. For example, if your personal computer has a fixed disk, the drive specifier for the UNIX file system is typically D: instead of C:. PC-Interface uses the next available drive specifier supplied by DOS. In the examples in this manual, references to drive C: mean the drive specified for the UNIX file system.

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Use the following procedure to log in from the command line.

1. In response to the system prompt, type:

```
login host1 username
```

 where *host1* is the name of the host you want to log in to and *username* is your user name. Alternately, you can specify only the host name; PC-Interface prompts you for your user name.

 Press Enter (↵).

 If the host is not available, PC-Interface returns the following message: .

```
login: host1 not available.
```

 Otherwise, PC-Interface prompts you for your password as follows:

```
Password:
```

2. Type your password and press Enter (↵). The characters you type do not appear on the screen, protecting the security of your password.

 PC-Interface attempts to establish a connection to the UNIX host you selected. If PC-Interface cannot establish a connection, it displays the following message on your screen:

```
login: login failed.
```


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3. When the connection is established, the following message appears on your screen:[1]

```
Welcome to PC-Interface.
Unix File System Available as Drive C:
A>
```

Logging In Over An RS-232 Connection Path

Use the following procedure to choose a UNIX host connection over an RS-232 connection path.

1. In response to the host-selection prompt, type the port number that appears on the menu next to PCI-RS232 Port and press Enter (↵).

 The following prompt replaces the host-selection prompt:

   ```
   Enter Baud Rate (300,1200,2400,4800,9600):
   ```

2. Type the baud rate you want to use for transmission to the host and press Enter (↵).[2]

[1] Note that the drive specifier you see might be different. For example, if your personal computer has a fixed disk, the drive specifier for the UNIX file system is typically D: instead of C:. PC-Interface uses the next available drive specifier supplied by DOS. In the examples in this manual, references to drive C: mean the drive specified for the UNIX file system.

[2] The most efficient baud rate for transmitting data to the UNIX host varies depending on your particular system configuration. In some networks, the fastest speed, 9600 baud, might cause errors in the host and result in performance degradation because of error recovery. If you are uncertain about which baud rate to use, consult your system administrator.

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PC-Interface prompts you to log in to your UNIX host. A five-line window appears at the bottom of your screen in which the UNIX host identifies itself and prompts you for your user name and password.

If the window remains blank, try pressing Enter again. If the screen is still blank, the automatic baud rate of the host may not match the baud rate you selected. To change the host baud rate, press the F1 function key repeatedly until the host identification appears.

When you have successfully logged in, you receive the UNIX prompt.

3. Press the F9 key.

 The window disappears and the following message is displayed:

   ```
   Connection Attempt in Progress
   ```

4. When the connection is established, the following message appears on your screen:[1]

   ```
   Welcome to PC-Interface.
   Unix File System Available as Drive C:
   A>
   ```

[1] Note that the drive specifier you see might be different. For example, if your personal computer has a fixed disk, the drive specifier for the UNIX file system is typically D: instead of C:. PC-Interface uses the next available drive specifier supplied by DOS. In the examples in this manual, references to drive C: mean the drive specified for the UNIX file system.

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Using The UNIX File System

Once you have completed the logging in process, you have access to the same UNIX files as you do when you access the UNIX host in any other way. These files are available to DOS on the virtual drive indicated in the connection message. The term "virtual drive" means that PC-Interface allows DOS to interface with the UNIX system as if the UNIX host were a colocated fixed disk drive even though it is not.

You can create or access files on the virtual drive using DOS commands or applications by specifying the virtual drive identifier as part of the file name. For example, to list a file called MEMO that is stored on UNIX, you would enter the following:

```
type c:memo
```

You can also change the default drive to the virtual drive, just as you would change to any real DOS drive. If the virtual drive identifier specified in the connection message is drive C:, for example, enter:

```
c:
```

In general, you can use any DOS command or utility with files on the virtual drive. However, since UNIX handles all disk management functions for the virtual drive, the following DOS commands are unnecessary and cannot be used for the virtual drive:

CHKDSK
DISKCOMP
DISKCOPY
FDISK
FORMAT
SYS

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If you try to issue one of these commands for the virtual drive or a file on the virtual drive, DOS returns a disk error.

You can copy files, including DOS commands or application programs, from diskette to the virtual drive following the same procedures you would to copy to a local fixed disk. You can create directories on the virtual drive, and you can set DOS search paths that specify directories on the virtual drive.

In short, you can do almost anything in your file services session you could if you were working on a stand-alone personal computer with a fixed disk.

In fact, as long as you only accessed files you had created on the virtual drive, you would never need to be aware of the UNIX system. But you would also be missing one of the important features of PC-Interface—the ability to take advantage of the UNIX environment.

When you use the host file services of PC-Interface, you can access other users' files (for which you have access permission), and you can make your files available to other users. You can use DOS applications to manipulate files created by a UNIX process or to create files for input to a UNIX process.

When you use PC-Interface in this way, you need to understand some UNIX features and a few basic differences between DOS and UNIX. The sections following "Ending a File Services Session" discuss some special considerations and the PC-Interface commands that allow you to perform UNIX-type functions from your host file services session. These topics include the following:

- Naming files
- Using DOS and UNIX text files
- UNIX file permissions

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- Executing UNIX processes
- Printing with PC-Interface

Ending A File Services Session

Use the following procedure to end your host file services session.

1. Change the current drive back to drive A: by typing:

   ```
   a:
   ```

 Press Enter (↵).

 (If you started PC-Interface from a fixed disk, change back to drive C: instead.)

2. Type:

   ```
   logout
   ```

 Press Enter (↵).

 PC-Interface disconnects you from the UNIX host and displays the following message:

   ```
   PC-Interface Logged Out
   ```

3. Although you cannot access files on the UNIX file system without starting another file services session, you can continue to use DOS and access files and programs located on diskettes or your personal computer's fixed disk.

 However, any search paths previously set (for example, in AUTOEXEC.BAT at initialization) remain in effect.

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display the contents of a directory on the virtual drive yields the following display even though the actual UNIX names for these files are lowercase.[1]

```
 Volume in drive C is host1
 Directory of  C:\S\JONES

.            <DIR>       4-25-85   4:21p
..           <DIR>       4-18-85   4:04a
PCI          <DIR>       4-18-85   7:48p
REPORTS      <DIR>       4-16-85   3:04p
CHAPTER  ONE      2478   7-22-85  10:08a
BDGTMEMO          3400   3-29-85   4:07p
STATUS   REP      2400   4-18-85   6:35p
PRJCTMEM          1465   3-31-85  11:14p
STAFF             3278   4-22-85   6:49p
        8 File(s)    151552 bytes free
```

Notice that names that appear to DOS to have file name extensions, like **chapter.one**, are displayed in the standard DOS manner with the "extension" listed in a separate column.

In general, you can access any file or directory in the UNIX file system, whether it was created with PC-Interface or under UNIX. However, you must use a special mapped name for UNIX files or directories that do not conform to DOS rules.

[1]When you add or delete very small files (2K) on the virtual drive, you may not see a change in the number of bytes free displayed by DIR. The number of bytes free for the virtual drive is calculated based on UNIX blocks and, therefore, may be off by plus or minus 1K as a result of round-off error.

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This includes names longer than DOS allows, names with more than three characters following a period, names with nonalphabetic characters that DOS does not recognize, and names with uppercase alphabetic characters.

When a UNIX name that does not conform to DOS rules is accessed by any DOS utility or application, PC-Interface translates, or maps, the name to a legal DOS name by truncating the name to three, four, or five characters and appending a unique index of one to three characters enclosed in braces. For example, a file called **messagetoall** might be mapped to the name MES{HAE}. You can determine the mapped name by issuing the DOS DIR command. In the following example, the DIR display shows the mapped names for additional UNIX directories and files called Mail, **messagetoall**, **message.tobob**, and **message toted**. Notice that the DOS DIR command shows only the mapped name, not the original UNIX name.

```
 Volume in drive C is host1
 Directory of  C:\S\JONES

.            <DIR>       4-25-85   4:21p
..           <DIR>       4-18-85   4:04a
PCI          <DIR>       4-18-85   7:48p
REPORT       <DIR>       4-16-85   3:04p
CHAPTER  ONE      2478   7-22-85  10:08a
BDGTMEMO          3400   3-29-85   4:07p
STATUS   REP      2400   4-18-85   6:35p
PRJCTMEM          1465   3-31-85  11:14p
STAFF             3278   4-22-85   6:49p
MAI{FPE}     <DIR>       6-19-85   8:50p
MES{HAE}          2400   6-18-85   6:35p
MES{HJI} TOB       250   6-25-85   4:18p
MES{BOM}           598   6-30-85   6:01p
       13 File(s)     148304 bytes free
```


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To display the contents of **messagetoall** using the DOS TYPE command, you enter:

```
type mes{hae}
```

Displaying UNIX-Style Directory Listings

Although you always use a UNIX file's mapped name with DOS commands, you sometimes want to know the original UNIX file or directory name. The PC-Interface UDIR command displays the contents of a UNIX directory in a form similar to what you would see if you could issue the UNIX **ls -l** command, showing both the UNIX name and its corresponding mapped name.

For example, issuing the UDIR command for the directory \S\JONES on the virtual drive results in the following display.

```
 Volume in drive C is host1
 Directory of C:\S\JONES

.              .              jones  drwxr-xr-x  <DIR>       4-25-85   4:21p
..             ..             root   drwxr-xr-x  <DIR>       4-18-85   4:04a
pci            PCI            jones  drwxrwxr-x  <DIR>       4-18-85   7:48p
report         REPORT         jones  drwxrwxrwx  <DIR>       4-16-85   3:04p
chapter.one    CHAPTER.ONE    jones  -rwxr-----         2478  7-22-85  10:08a
bdgtmemo       BDGTMEMO       jones  -rwxrw-r--         3400  3-29-85   4:07p
status.rep     STATUS.REP     jones  -rwxr--r--         2400  4-18-85   6:35p
prjctmem       PRJCTMEM       jones  -rwxr--r--         1465  3-31-85  11:14p
staff          STAFF          jones  -r--r-----         3278  4-22-85   6:49p
Mail           MAI{FPE}       jones  drwxr-----  <DIR>       6-19-85   8:50p
messagetoall   MES{HAE}       jones  -rw-r--r--         2400  6-18-85   6:35p
message.tobob  MES{HJI}.TOB   jones  -rw-r--r--          250  6-25-85   4:18p
message_toted  MES{BOM}       jones  -rw-r--r--          598  6-30-85   6:01p
       13 file(s)          148304 bytes free
```


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Just as with the DOS DIR command, you can also specify specific file names or use the asterisk (*) or question mark (?) wild-card characters with UDIR. However, UDIR interprets these as DOS does, not as UNIX does.

For more on UDIR, refer to Chapter 5, Command Summary.

Changing File Names

Sometimes it is inconvenient to work with the mapped name. You might want to avoid constantly checking UDIR to determine mapped names for files whose UNIX names you know. Perhaps you regularly use DOS utilities or applications to create files for later use with UNIX processes, and you want to use names for these files that do not conform to DOS rules.

The PC-Interface UREN command allows you to rename files when the source or destination file names are not valid DOS names. Suppose you have created several files--say, MESSAGE1, MESSAGE2, and MESSAGE3--during your file services session. If you would like these files to have more descriptive UNIX names, you can rename them by entering:

```
uren message1 messagetobob
uren message2 messagetojohn
uren message3 messagetosteve
```

The UREN command works like the DOS REN command, but provides you the additional ability to rename directories. For example, to avoid having to use the mapped name, which might be hard to remember or to type, you could rename a UNIX directory called **directmail** with a valid DOS name by entering:

```
uren directmail dmail
```


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As illustrated, you always use the full UNIX name, not the mapped name, when you use the UREN command.

Finally, because UREN accepts full path names, you can also use it to "move" a file from one directory to another on the virtual drive, as the following example shows:

```
uren \s\jones\report\budget \s\jones\memos\budgetmemo
```

For more on UREN, refer to Chapter 5, Command Summary.

Using DOS And UNIX Text Files

DOS And UNIX Text Formats

DOS and UNIX differ in the way in which each stores text files. UNIX stores text lines as a sequence of characters terminated by a line-feed character. DOS, on the other hand, terminates text lines with a carriage-return character, followed by a line-feed character. A file created in one format appears corrupted when accessed by the other.

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For example, suppose you have the following file in UNIX format:

```
Dear Bob:

This letter is in response to your inquiry of 25 February.
The information you requested is enclosed, along with other
materials that should help you evaluate our product line.
```

If you listed this file with the DOS TYPE command, you would see the following:

```
Dear Bob:

        This letter is in response to your inquiry of 25 February.
                                                                  T
he information you requested is enclosed, along with other
                                                                materials
that should help you to evaluate our product line.
```

Similarly, if you had created the original file in DOS format and someone listed it with a UNIX **cat -v** command, they would see the following:

```
Dear Bob:^M
^M
This letter is in response to your inquiry of 25 February.^M
The information you requested is enclosed, along with other^M
materials that should help you evaluate our product line.^M
^Z
```


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Converting UNIX And DOS Files

You can use any file created during a PC-Interface file services session—your own or someone else's—just like any DOS file since these files are stored in DOS format even when they are created on the virtual drive.

However, to use a text file in UNIX format with DOS programs in your file services session, you must convert the file to DOS text format using the PC-Interface UNIX2DOS command. For example:

```
unix2dos  letter  ltr.dos
```

You can also convert the file and copy it from the virtual drive to a local drive on your personal computer in one step, as the following example illustrates.

```
unix2dos  c:bdgtmemo  a:budget
```

When you create text files during your file services session that you want to use later in a UNIX session, you can convert them to UNIX text format with the PC-Interface DOS2UNIX command. For example:

```
dos2unix  memo  memo.unx
```

When you enter the UNIX2DOS or DOS2UNIX command from PC-Interface, you use DOS file names.

When you omit the second file name, these commands display the text file conversions on your screen but do not save them.

When you don't know the format of a text file, you should use the UNIX2DOS or DOS2UNIX commands to convert it to the format you need, just to be sure. The commands do not change anything when the file is already in the target format.

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For more on DOS2UNIX and UNIX2DOS, refer to Chapter 5, Command Summary.

UNIX File Permissions

Unlike most DOS systems, the UNIX system can be accessed by more than one user. It therefore provides tools to prevent inspection, alteration, or execution of files by unauthorized users. The owner (usually the creator) of each UNIX file can grant or deny himself, other users in his user group, or all UNIX users permission to read, modify, or execute the file.

All the files and directories you create or access on the virtual drive during a PC-Interface file services session are protected by these permission assignments. The term "permission mode" (or just mode) refers to the specific assignments for a file or directory—that is, who can read it, who can write to it, and who can execute it.

Displaying File Modes

When you create a file or a directory on the virtual drive, it automatically inherits the default permission mode set by the UMASK environment variable from the UNIX root.[1] You can check the current mode of any file or directory by creating a new file on the virtual drive and issuing the UDIR command to display the file's permission mode. The second column of the display shows the owner, and the third column shows the current mode as a 10-character string, in the following form:

[1] For more information on setting UMASK environment variables, contact your system administrator.

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```
drwxrwxrwx
```

The first character indicates whether the entry is a file (-) or a directory (d). The remaining nine characters indicate the read, write, and execute permissions in groups of three. That is, the first set of three characters represents the permissions for the file or directory owner, the second set of three the permissions for others in the owner's user group, and the last set the permissions for everyone else.

An **r** specifies permission to display or read the file; a **w** specifies permission to modify or write the file; and an **x** specifies permission to execute the file. A hyphen (-) in any position indicates that the particular permission is denied.

Changing File Modes

You can change the permission modes for your files and directories on the virtual drive with the PC-Interface UCHMOD command.

For example, suppose you want to protect a file called BUDGET so that no one, even you, can modify it. You could issue the following UCHMOD command:

```
uchmod  a=r-x  budget
```

In this form of the UCHMOD command, you first specify the group your change affects—**u** for you the owner, **g** for others in your user group, **o** for others on the system, and **a** for all three groups—followed by an equal (=) sign and the explicit permission modes you are assigning.

Alternately, you can indicate only the permissions you want to change without having to specify all the permission characters.

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To change the write permission so you can modify your BUDGET file, you could enter the following:

```
uchmod  u+w  budget
```

To give write and execute permission to others in your user group as well as everyone else on the system, you could enter the following:

```
uchmod  go+wx  budget
```

In this form of the UCHMOD command, you specify first the groups your change affects, followed by a plus (+) or minus (-) sign, depending on whether you are granting or denying the permission, followed by the permissions you are changing.

Effect Of Directory Permissions On Files

You must have execute permission for a directory on the virtual drive in order to access any of the files in that directory. Without execute permission, you cannot copy files from or into the directory, make the directory your working directory, or rename, inspect, or modify any file in the directory.

Therefore, to provide access to files, be sure you also assign the appropriate permissions to your directories. On the other hand, if you want to completely deny access to files in a directory without changing the mode for each file, you could remove execute permissions from the directory.

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DOS Commands And File Permissions

Because DOS does not have the same system of file permissions, the interaction of DOS commands with files on the virtual drive can result in a few unexpected results.

When you execute DOS programs that you have stored on the virtual drive, DOS does not refer to the presence or absence of execute permission for the file. Rather DOS identifies executable files by their file name extensions—COM, .EXE, or .BAT. Just be sure you have read permission for DOS executable files and that they are in directories with execute permission.

Sometimes the message DOS returns is affected by the file permissions. For example, when a DOS command you issue encounters a file for which you do not have read access, DOS returns a "File not found" message even though the file exists. Similarly, if you try to create a file in a directory for which you do not have write access, DOS returns a "File creation error" or "Directory full" message.

DOS Applications and File Permissions

Remember that DOS applications are designed for a single-user environment. When used with PC-Interface in a multiuser environment, DOS applications do not protect your files from being simultaneously updated by you and another user with write permission. In fact, some DOS applications do not even protect your file from being updated by another user with only read permission. These include applications that update files by first renaming the original version (usually to a name with a .BAK extension) and then creating a new version with the original name.

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You want to carefully consider which combination of file and directory permissions give you the most appropriate protection. For example, to prevent a file from being simultaneously updated by someone else while you are working on it, you could temporarily remove all others' read and write permissions for that file. This would prevent anyone from even looking at the file until you were done. Alternately, you could remove everyone else's write permission for the directory that contains the file. This would allow others to look at a file you are working on but not to update it. On the other hand, it would also prevent others from updating any other file in the directory.

Executing UNIX Processes

If you are familiar with both DOS and UNIX, you might find occassions during a host file services session when you would like to use a UNIX process instead of a DOS command or application. The PC-Interface UEXEC command lets you issue a UNIX command from within your host file serices session without having to switch to terminal emulation.

For example, to generate a UNIX-style manual page for the **mail** command, you could type:

```
uexec -s "man -n mail > maildoc"
```

UEXEC passes the quoted command string to the default UNIX system shell (the **s** option) for execution. (To invoke UNIX commands with the C shell, use the **c** option instead of **s**.) In this example, the **man** command with the **n** option is executed and the output—a formatted manual page describing the **mail** command—is written to a file called **maildoc**.

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When the UNIX process completes, UEXEC displays the process identification number and the process status. (A successful process returns a status of 0 0.) You can then resume your DOS work, perhaps using a DOS application to include the MAILDOC file in a larger document.

When you do not want to wait for a UNIX process to finish before resuming your DOS work, you can use the **n** option, as follows:

```
uexec -s -n "man -n mail > maildoc"
```

To find out the status of a process for which you did not wait, type:

```
uexec  -w
```

For more on UEXEC, refer to Chapter 5, Command Summary.

Printing With PC-Interface

During a file services session, you can print files from the virtual drive, as well as from local drives, on a local printer, if one is connected to your personal computer. You can use any of the standard DOS printing methods:

- Pressing the print-screen key (PRT SC) to print the current screen contents or pressing the CTRL and PRT SC keys together to print continuous screen contents.
- Issuing the DOS PRINT command and specifying the appropriate file name.
- Using the DOS COPY command to copy a file to the local printer device (PRN).

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- Invoking the print function from within a DOS application.

Alternately, you can direct any file to a remote printer connected to the UNIX system, using the PC-Interface PRINTER command. Before you issue your print request, type:

```
printer remote
```

Press Enter (↵). (You can switch back to local printing at any time by entering PRINTER LOCAL.)

When you specify PRINTER REMOTE, you can use the following printing methods:

- Pressing the print-screen key (PRT SC) to print the current screen contents. (You cannot use CTRL and PRT SC with PRINTER REMOTE.)

- Using the DOS COPY command to copy a file to the remote printer (LPT1).

- Invoking the print function from within a DOS application.

When you invoke printing from within a DOS application, PC-Interface spools your file but does not send it to the printer until you exit the application. When you want the spooled file sent to the printer before you exit the application, you can specify a timeout period using the /T option on the PRINTER REMOTE command. For example, to request remote printing after 5 seconds, type:

```
printer remote /t5
```

You can specify timeout periods from 5 to 360 seconds in this

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way. When you use the /T option with no timeout period specified, the spooled file is sent to the printer after a default 45 seconds.

To display the current printer and timeout setting, type:

```
printer
```

Be sure that you don't log out of your host file services session until the spooled file has been sent to the printer. If you do, your print job is deleted.

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Chapter 3. Using Your Computer As A UNIX Terminal

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Introduction

PC-Interface lets you interact with a UNIX host in either of two ways:

- Your personal computer can emulate a VT-100 terminal, enabling you to conduct a standard UNIX host session.
- Your personal computer can use the file services of the host while running DOS applications as if the host were a colocated fixed disk.

You can work entirely in one mode or the other or you can switch back and forth between them.

PC-Interface terminal emulation supports most of the attributes of a standard VT-100 terminal, including the four programmable function keys, numeric keypad cursor control, paging, control and escape sequences, and flow control (CTRL-Q and CTRL-S). It does not support full 132-column mode or scrolling.

This chapter tells you how to use terminal emulation, including:

- Beginning and ending a terminal emulation session.
- Switching between terminal emulation and host file services or other DOS session.
- Using the HELP menu, status line, and keyboard.
- Transferring files.

Chapter 2 describes using the host file services.

The procedures described in this chapter and the examples shown assume that PC-Interface has been installed for your personal computer as described in Appendix A.

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Beginning A Terminal Emulation Session

You can conduct a terminal emulation session independently of a host file services session or in conjunction with a file services session. When you conduct a terminal emulation session in conjunction with a file services session, you must begin your file services session before you begin your terminal emulation session.

The following procedure starts a terminal emulation session. This allows you to communicate directly with UNIX.

1. If you already have a host file services session in progress, change the default drive back to the drive that contains the PC-Interface software and skip to step 4.

2. If you are using a diskette, insert your PC-Interface working diskette in drive A: and close the drive door. If you are using a fixed disk, leave the drive A: door open.

3. Switch ON your personal computer, if you have not already done so. If the system unit is already on, press and hold the CTRL and ALT keys; then press the DEL key.

 The following message appears:[1]

```
PC-Interface Release 2.7.4 (Serial #x.xxxx) Initialized
```

[1] Depending on other software that may be installed for your personal computer, you might see other messages first.

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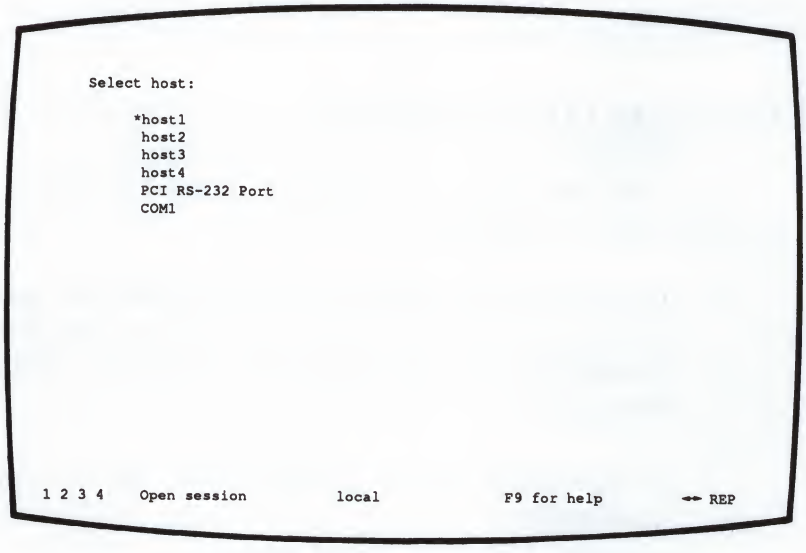


4. In response to the system prompt (A> if you are using a diskette; C> if you are using a fixed disk), type:[1]

 em

 Press Enter (↵).

 The terminal emulation logo screen appears, with the Initialization message on the status line, followed by the host-selection menu:



[1] The EM command can be issued from any drive, including the virtual drive if you have a host file services session in progress, as long as you qualify the command with the appropriate drive specification (for example, A:EM). When you save your terminal session, the PC-Interface terminal emulator writes the session file (EM.SES) to the current directory on the current drive (unless you set the EMSES environment variable when you tailor your PC-Interface installation as described in Chapter 4).

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The terminal emulation host-selection menu screen shows you the UNIX host connection paths available to you. When your personal computer is connected to one or more hosts over Ethernet, the host names appear on the menu. When your personal computer is connected to a host over an RS-232 connection path, the words PCI-RS232 Port and COM1 appear on the menu. You may have one or more choices on your menu screen. When you have more than one choice, you can choose the same connection path for terminal emulation and host file services or you can choose different connection paths.

Logging In Over Ethernet

Use the following procedure to choose a UNIX host connection over Ethernet.

1. In response to the host-selection menu, press the space bar until the asterisk (*) is opposite the host name for the host to which you want to establish a connection and press Enter (↵).

 The following prompt appears to the right of the host-selection list:

   ```
   Extra pages (0-4) [4]:
   ```

2. The PC-Interface terminal emulator lets you save up to the last four screens, or pages, of session text as it scrolls off your screen during your terminal emulation session. (Each page requires about 4K of storage space.) When you want the default of four pages, press Enter (↵). When you want to save fewer pages, type the number of pages you want to have saved and press Enter.

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The following message appears below the extra-pages prompt:

```
Opening the connection . . . .
```

When the Ethernet connection is successfully established, the screen clears and the UNIX host login banner and prompt appears. (If the connection cannot be established, press the F10 function key to return to your DOS session and contact your system administrator.)

3. Respond as you normally do when conducting a UNIX terminal session (usually by entering your UNIX user name and password).[1]

Logging In Over An RS-232 Connection Path

Use the following procedure to choose a UNIX host connection over an RS-232 connection path.

[1] The UNIX host must recognize your terminal as a VT-100 terminal. UNIX recognizes the terminal capabilities of your personal computer by referring to the TERM environment variable. You should include the following lines, which set the TERM variable properly, in the **.profile** file in your home directory if you use the PC-Interface terminal emulator regularly:

```
TERM=VT100
export TERM
```

If you use the C shell, substitute the following line:

```
setenv TERM vt100
```


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1. When you want to establish your terminal emulation session over the same RS-232 connection path as an existing host file services session, press the space bar until the asterisk (*) is opposite the words PCI-RS232 Port.

 When you do not have an existing host file services session or your existing host file services session is over an Ethernet connection path, press the space bar until the asterisk (*) is opposite the word COM1.

 Press Enter (↵).

 The following prompt appears to the right of the host-selection list:

   ```
   Extra pages (0-4) [4]:
   ```

2. The PC-Interface terminal emulator lets you save up to the last four screens, or pages, of session text as it scrolls off your screen during your terminal emulation session. When you want the default of four pages, press Enter (↵). When you want to save fewer pages, type the number of pages you want to have saved and press Enter.

 The following message appears below the extra-pages prompt:

   ```
   Opening the connection . . . .
   ```

 (If the connection cannot be established, press the F10 function key to return to your DOS session and contact your system administrator.)

 When you establish an RS-232 connection using the same port for terminal emulation and host file services (PCI-RS232 Port), your terminal emulation session automatically uses the same baud rate and other

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parameters as the host file services session.

However, when you establish an RS-232 connection for terminal emulation only (COM1), PC-Interface presents the Change Parameters menu to let you enter the communication parameters you want:

```
Terminal mode:                Baud rate:

  * No echo                     * 9600
    Echo                        4800
    Local                       2400
                                1200
                                 600
Status line:                     300
                                 150
  * Status line                  110
    No status line
                              Parity:

                                * Space
                                  Mark
                                  Even
                                  Odd
                                       F6 to exit
 Tabs:
12345678901234567890123456789012345678901234567890123456789012345678901234567890
        T       T       T       T       T       T       T       T       T
 1 2 3 4    Change parameters       local           F9 for help          ←→ REP
```

3. To choose the default parameters, indicated by asterisks (*), press the F6 function key. To change parameters, use the TAB (⇆) or Enter (↵) key to move from one parameter field to the next and the space bar to move the asterisk (*) to the desired option within each field. The section "Changing RS-232 Connection Path Parameters" describes the parameters in more detail.

 When you have changed the parameters to the desired values, press Enter or the F6 function key. The screen clears and the UNIX host login banner and prompt

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appears.

If the screen remains blank, try pressing Enter again. If the screen is still blank, the automatic baud rate of the host may not match the baud rate you selected. To change the host baud rate, hold down the CTRL key and press the Scroll Lock (Break) key repeatedly until the host identification and prompt appear.

4. Respond as you normally do when conducting a UNIX terminal session (usually by entering your UNIX user name and password).[1]

Changing RS-232 Connection Path Parameters

You can change certain communication parameters when you establish a terminal emulation session over an RS-232 connection path. When your terminal emulation session is over a different path than your host file services session (or

[1] The UNIX host must recognize your terminal as a VT-100 terminal. UNIX recognizes the terminal capabilities of your personal computer by referring to the TERM environment variable. You should include the following lines, which set the TERM variable properly, in the **.profile** file in your home directory if you use the PC-Interface terminal emulator regularly:

```
TERM=VT100
export TERM
```

If you use the C shell, substitute the following line:

```
setenv TERM vt100
```


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you have no host file services session), PC-Interface provides you with the opportunity to review and change these parameters during the logging in process by presenting the Change Parameters menu.

However, you can review and change these parameters at any time during your terminal emulation session by pressing the F6 function key. Even when your terminal emulation session is over the same RS-232 path as a host file services session, you can change some parameters using the Change Parameters menu.

When PC-Interface displays the Change Parameters menu, the cursor is positioned at the current default value for the first parameter, Terminal Mode. The current default value for each parameter is indicated by an asterisk (*).

The following parameters appear on the Change Parameter menu:

Terminal Mode—This parameter indicates what happens to characters you type at the keyboard.

When the No Echo value is chosen, characters you type are transmitted to the host, but they are not displayed on your screen until the host echoes them back to your personal computer. This is the default value.

When the Echo value is chosen, characters are displayed on your personal computer screen before being transmitted to the host. With this value, you have no verification that the host actually receives the character you type. However, the Echo value should be used when the host communicates in half-duplex mode.

When the Local value is chosen, characters are displayed on the screen, but they are not transmitted to the host.

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Status Line—This parameter indicates whether or not the status line is displayed on line 25 of your screen. Displaying the status line is the default.

Baud Rate—This parameter indicates the data transmission rate, in bits per second, for data sent from your terminal to the UNIX host. The default is 9600.

Parity—This parameter indicates the parity-checking scheme used for the data transmitted from your terminal. The default is space parity.

Tabs—This parameter indicates the tab settings used during the terminal emulation session. The defaults are indicated by the letter T on the line below the numbered ruler line.

To retain the default value for a parameter shown on the Change Parameters menu, press the TAB key (⭾).

To change specific parameter values, first move to the parameter you want to change by pressing the TAB (⭾) or Enter (↵) key. Then press the space bar. Each time you press the space bar, the asterisk and cursor move to the next value. When the asterisk is opposite the desired value, press Enter.

You can also use the cursor keys to move the cursor to the desired value. In this case, the asterisk remains at the current default value until you press the Enter key.

When you press the Enter key, the new default value is set and the cursor moves to the default value of the next parameter. To move back to a previous parameter, press the Shift key (⇧) and TAB key (⭾) simultaneously.

When the default values in all parameter fields are set as desired, press the F6 function key to save the values and leave

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the Change Parameters menu. (Alternately, you can press the Enter (↵) key when the cursor is opposite the "F6 to exit" message.

Switching Between Terminal Emulation And Host File Services Or DOS

The following procedure allows you to switch between your terminal emulation session and host file services (or DOS).

1. From the terminal emulation session, press the F10 function key.

 The PC-Interface terminal emulator creates an EM.SES file, if one does not exist, in the current directory on the current drive from which you issued the last EM command.[1] Your terminal emulation session screens are saved in this file. The size of the file depends on the number of pages you requested when you began the session (from 4K to 20K).

 Your terminal emulation session screen clears and your DOS screen appears just as it looked when you issued the EM command.

2. In response to the operating system prompt, continue your host file services or DOS session.

[1] Alternately, you can tailor your PC-Interface installation to specify an absolute location for the EM.SES file regardless of the current directory and drive. Refer to "Setting the Terminal Emulation Environment Variable" in Chapter 4.

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3. To return to your terminal emulation session, change back to the same directory and drive from which you entered the previous EM command (the directory and drive that contains the EM.SES file) and type:

   ```
   em
   ```

 Press Enter (↵).

 Your DOS screen clears and your terminal emulation session screen appears just as it looked when you pressed the F10 function key. You are still connected to the UNIX host, logged in, and in the same directory you were in when you left terminal emulation. That is, CD (change directory) commands issued while you are in host file services do not affect the current directory for your terminal emulation session.

Closing A Terminal Emulation Session

The following procedure closes your terminal emulation session.

1. Log out of your UNIX host by typing:

   ```
   logout
   ```

2. Press the F7 function key.

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The Close Session menu appears as follows:



Note that the Close option specifies your current connection path.

3. Press Enter (↵).

 The PC-Interface terminal emulator presents the Open Session menu, giving you an opportunity to establish another terminal emulation session.

4. Press the F10 function key.

 The Open Session menu screen clears and your screen appears just as it looked when you issued the EM command.

If you always log into terminal emulation over the same connection path and don't want to go through the entire log-in

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menu sequence each time, substitute the following procedure for steps 3 and 4.

3. Press the space bar to move the asterisk (*) to the Leave Open option. Press Enter (↵).

4. Press the F10 function key.

 The PC-Interface terminal emulator creates an EM.SES file, if one does not exist, in the current directory on the current drive from which you issued the last EM command.[1] Your terminal emulation session screens are saved in this file. The size of the file depends on the number of pages you requested when you began the session (from 4K to 20K).

 The Close Session menu clears and your DOS screen appears just as it looked when you issued the EM command.

 The next time you issue the EM command, PC-Interface terminal emulation skips the Open Session and Change Parameters menus, establishes a connection over the same path as your previous session, and displays the session screen from the current EM.SES file. You respond to the new log in prompt from the UNIX host.

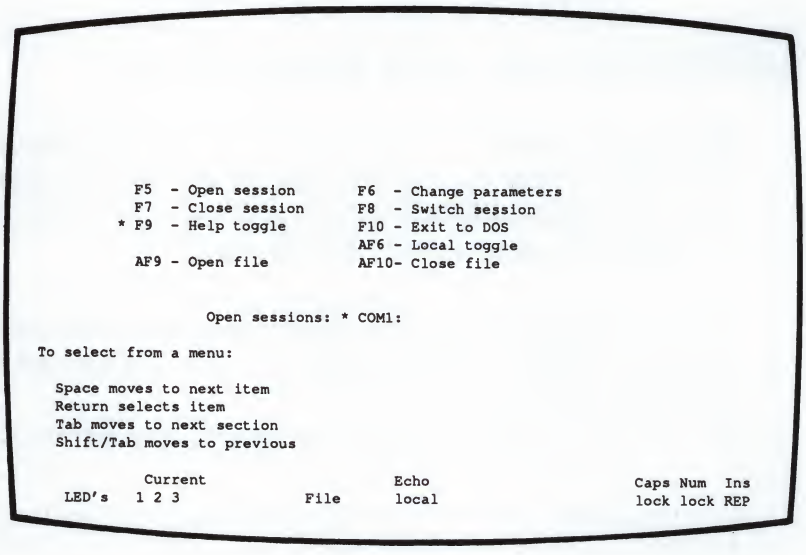
 Anytime you want to log in to terminal emulation over a different connection path or to a different host, delete the EM.SES file before you issue the EM command.

[1] Alternately, you can tailor your PC-Interface installation to specify an absolute location for the EM.SES file regardless of the current directory or drive. Refer to "Setting the Terminal Emulation Environment Variable" in Chapter 4.

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Using The Help Menu

PC-Interface terminal emulation provides a Help Menu that shows the meanings of the function keys, the current host connection path, instructions for making menu selections, and a description of the status line, as follows:



You can display the Help Menu at any time during your terminal emulation session by pressing the F9 function key.

The Help Menu shows two parameters—function key selections and host connection paths. An asterisk (*) indicates the current value for each.

To return to your terminal emulation session, simply press F9 again. This represents the normal use of the Help Menu — to review information and return to your session.

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You can also use the Help Menu to review the function key choices and then execute one of these functions. To select a function key for execution, you move the space bar until the asterisk is opposite the function you want to execute and then press the Enter key. Alternately, you press the function key you want.

Session Screen And Status Line

During your terminal emulation session, your terminal screen shows the results of communication between your personal computer and the UNIX host, just as if you were using a VT-100 terminal connected directly to the host.

The last line on your screen shows the status of the terminal emulator (unless the Status Line parameter has been set to no status line), as follows:

```
1 2 3 4    COM1:                    F9 for help          REP
```

The status line divides into three sections—an LED status section, a session status section, and a keyboard status section.

The LED status section appears at the leftmost edge of the status line. It consists of the numbers 1, 2, 3, and 4, which represent the LEDs on the VT-100 keyboard. The ON position for each LED is indicated by highlighting the corresponding number, either in reverse video (for monochrome displays) or in red (for color displays). The information conveyed by the LEDs is application-specific, and

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many applications do not turn on the LEDs.

The session status section appears in a reverse video band at the center of the screen. The current host connection path is indicated on the left, and the message "F9 for help" appears on the right. When you choose local mode, the word "local" appears to the left of the "F9 for help" message. When you use the file transfer functions, additional information is displayed to the left of that.

The keyboard status section shows the status of the Caps Lock, Num Lock, and Insert keys. When the Caps Lock key is on, CAPS appears just to the right of the reverse video band. When the Caps Lock key is off, this section of the status line is blank. When the Num Lock key is on, NUM appears to the right of the CAPS indicator. When the Num Lock key is off, a pair of left and right arrows replaces NUM. REP in the rightmost field of the status line indicates the normal replace mode. When you use the Insert key in local mode, INS appears instead.

The Personal Computer Keyboard

When you are using the PC-Interface terminal emulator, most of the keys in the standard typewriter portion of your keyboard send the expected ASCII character sequences. However, a few of these keys have special meanings, as do the function keys and some of the keys in the numeric keypad. Some keys have no function at all when you use the terminal emulator, while others have special functions when used in combination. The following sections describe these keys and key combinations.

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The Standard Typewriter Area

Caps Lock The Caps Lock key locks alphabetic characters in uppercase. If you press the Shift key while in Caps Lock, the alphabetic characters have their unassisted or lowercase functions. Note that characters other than alphabetics are not affected by Caps Lock and require using the Shift key (⇧) to obtain the "uppercase" character.

↵ The Enter key sends the ASCII carriage return character (octal 015).

PrtSc * When you press the Print Screen key with the Shift key, the image on your screen is printed on either your local printer or the remote UNIX printer, depending on whether you have a current host file services session.

When you enter terminal emulation from a host file services session, the shifted Print Screen key sends printing to the printer specified by the PRINTER command option in effect when you entered terminal emulation.

When you enter terminal emulation without first establishing a host file services session, the shifted Print Screen key sends printing to the local printer attached to your personal computer.

If printing is directed to a local printer and there is no printer attached to your personal computer, your terminal may appear to be locked for a short time until the print process gives up.

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←	The backspace key moves the cursor one character to the left, deleting the current character. The backspace key transmits the ASCII backspace character (octal 010).
Alt	The ALT key alone has no function in terminal emulation but is used in combination with some of the function keys to perform certain functions. These combinations are described later.
Ctrl	The CTRL key alone has no function in terminal emulation but can be used with other keys to transmit control characters to the UNIX host.
Ctrl + **Q**	You can start the flow of characters from the UNIX host by pressing the CTRL and Q keys in combintion. PC-Interface also uses the CTRL-Q combination internally for flow control.
Ctrl + **S**	You can stop the flow of characters from the UNIX host by pressing the CTRL and S keys in combination. PC-Interface also uses the CTRL-S combination internally for flow control.
Esc	The escape key transmits the ASCII escape character (octal 033) to the UNIX host.
⇆	The TAB key transmits the ASCII tab character (octal 011).
↑	Pressing either Shift key in combination with one of the character keys in the typewriter area causes the character to display (and transmit) its "uppercase" value.

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The Numeric Keypad

Num Lock	Pressing the Num Lock key places the numeric keypad in numeric mode. Pressing the Num Lock key again returns the keypad to cursor control mode.
Ctrl + Scroll Lock	The CTRL and Scroll Lock keys, in combination, send a break signal over an RS-232 connection path (COM1 only). The key combination has no meaning when the terminal emulation session is over Ethernet or the same RS-232 connection as a host file services session. (PCI-RS232 Port).
Ins	The Insert key allows you to insert text in existing text on your display when the emulator is in local mode. Text inserted in local mode is not transmitted to the UNIX host. The Insert key may also have meaning to some UNIX applications.
Del	The Delete key transmits the ASCII delete character (octal 177) to the UNIX host.
↑↓←→	The cursor control keys move the cursor up or down a line or left or right a character.
Home	The Home key moves the cursor to the top left corner of your display.
End	The End key moves the cursor to the right of the last character on your display.

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Ctrl + PgUp The CTRL and Page Up keys, in combination, are used to display text that has scrolled off the top of your screen during your terminal emulation session. Each time you press the CTRL and Page Up keys, the previous page of text (24 lines) is displayed, up to the number of pages you specified to be saved when you opened the terminal emulation session.

Ctrl + PgDn The CTRL and Page Down keys, in combination, are used to display text that scrolls off the bottom of your screen when you use the CTRL and Page Up keys. Each time you press the CTRL and Page Down key, the next page of text (24 lines) is displayed, until the current session screen appears.

The Function Keys

F1 The F1 function key transmits the three-character ASCII sequence ESC, O, and P (octal 033, 117, and 120). The effect of this sequence is application dependent and is the same as the PF1 key on a VT-100 terminal.

F2 The F2 function key transmits the three-character ASCII sequence ESC, O, and Q (octal 033, 117, and 121). The effect of this sequence is application dependent and is the same as the PF2 key on a VT-100 terminal.

F3 The F3 function key transmits the three-character ASCII sequence ESC, O, and R (octal 033, 117, and 122). The effect of this sequence is application dependent and is the same as the PF3 key on a VT-100 terminal.

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F4 The F4 function key transmits the three-character ASCII sequence ESC, O, and S (octal 033, 117, and 123). The effect of this sequence is application dependent and is the same as the PF4 key on a VT-100 terminal.

F5 For efficiency, PC-Interface automatically issues an F5 to present you with the host-selection menu when you invoke the terminal emulator or close a terminal emulation session. You should not use the F5 function key when you have a terminal emulation session open.

F6 Pressing the F6 function key displays the Change Parameters menu.

When you log in to a terminal emulation session over an RS-232 connection path (COM1), you automatically see the Change Parameters menu as part of your log in. You can invoke it at any time during a terminal emulation session to change the parameters.

When you log in to a terminal emulation session over Ethernet, you can press F6 to display the Change Parameters menu during your terminal emulation session, but you can only change the terminal mode, status line, and tab parameters.

F7 Pressing the F7 function key displays the Close Session menu.

F8 The F8 function key has no meaning for terminal emulation to a UNIX host.

F9 Pressing the F9 function key displays the Help menu.

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F10	Pressing the F10 function key suspends the terminal emulation session and returns you to your host file services session, or to DOS if you did not have a host file services session in progress when you entered terminal emulation.
Alt + F6	Pressing the ALT and F6 keys, in combination, changes the emulator to local mode. In local mode, characters you type display on your screen but are not transmitted to the host. Pressing ALT and F6 again returns you to remote mode.
Alt + F9	Pressing the ALT and F9 keys displays the File Transfer menu. You can transfer files between the host and your personal computer in either direction, as described in "Transferring Files."
Alt + F10	Pressing the ALT and F10 keys closes files opened during file transfer.

Transferring Files

Although it is usually easier, faster, and more reliable to transfer files between your personal computer and the UNIX host by copying to or from the virtual drive in a host file services session, you can also transfer ASCII text files as part of a terminal emulation session.

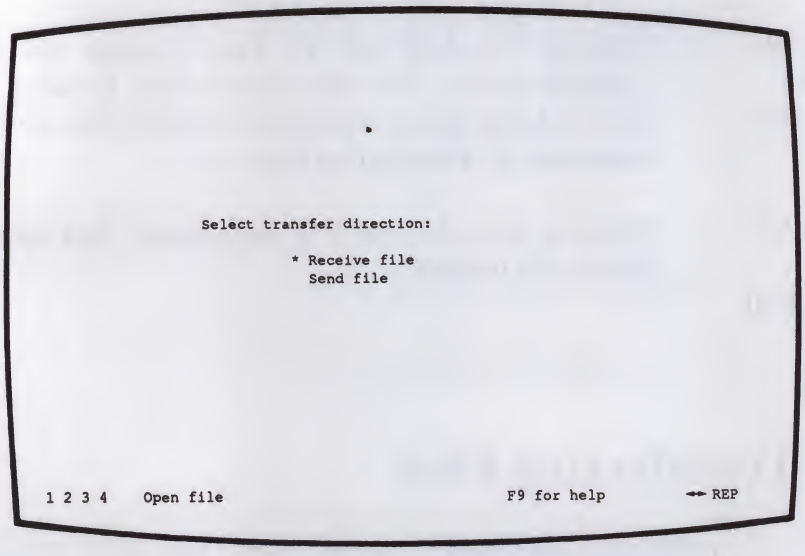
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Transferring a File from UNIX to Your Computer

The following procedure transfers an ASCII text file from your UNIX host to your personal computer.

1. Press the ALT key and the F9 function key.

 The Open File menu appears:



2. Press Enter (↵) to choose the Receive file option.

 The following prompt appears on the menu below the Send file option:

```
File name:
```


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3. Type the name of a new file that is to receive the file you are transferring. You can optionally include a local drive specifier. Press Enter (↵).

 The terminal emulator opens the new file on the local drive you specify. If you do not specify a drive, the file is opened on the current drive (the drive from which you entered terminal emulation). The file name you specified appears in the center of the status line.

 The menu screen clears and your terminal emulation session screen reappears.

4. Continue with your terminal emulation session. The results of any commands you enter are displayed on your screen and sent to the opened file on your personal computer.

5. To end file transfer, press the ALT key and the F10 function key. PC-Interface terminal emulation closes the file on your personal computer, and the file name disappears from the status line.

Transferring Files from Your Computer to UNIX

The following procedure transfers an ASCII text file from your personal computer to your UNIX host.

1. Issue a UNIX command that expects its input from standard input (the keyboard). The following command, for example, directs keyboard input into a file called **savetext**:

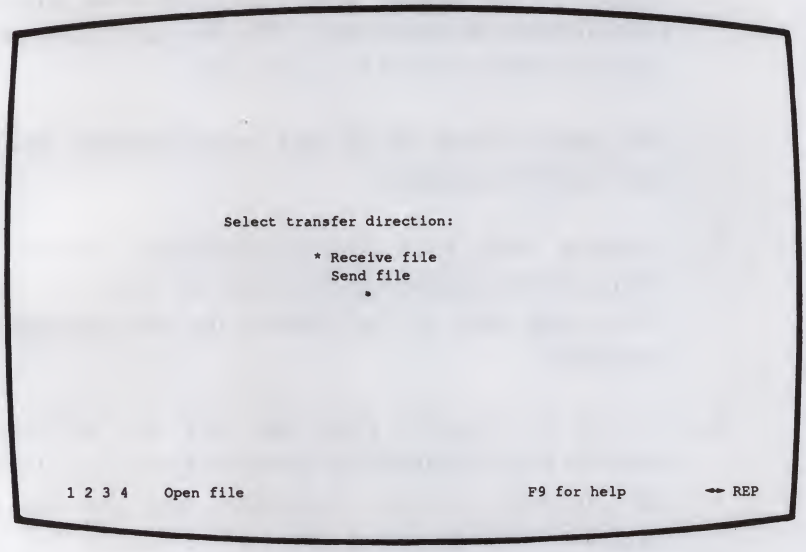
```
cat > savetext
```


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Press Enter (↵).

2. Press the ALT key and the F9 function key.

 The Open File menu appears:



3. Press the space bar to move the asterisk and choose the Send file option. Press Enter (↵).

4. The following prompt appears on the menu below the Send file option:

   ```
   File name:
   ```

5. Type the name of the personal computer file you want to send to the host. You can optionally include a drive specifier. Press Enter (↵).

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The terminal emulator looks for and opens the file on the drive you specify. If you do not specify a drive, the terminal emulator searches for the file on the current drive (the drive from which you entered terminal emulation). The file name you specified appears in the center of the status line.

The following prompt appears on the menu below the file name option:

```
Select sending speed:

      * Character at a time
        Line at a time
        Whole file
```

6. Press the space bar until the asterisk (*) is opposite the Whole file option.[1] Press Enter (↵).

 The menu screen clears and your terminal emulation session screen reappears. The file name you specified is transferred to the UNIX host as if it were being typed at your keyboard.

7. To end file transfer, press the ALT key and the F10 function key. PC-Interface terminal emulation closes the file on your personal computer, and the file name disappears from the status line.

You may need to select a lower baud rate for file transfer than you normally use for terminal emulation since your personal computer can send characters faster than the UNIX host can

[1] Normally, you should transfer ASCII text files using the whole file option. If you need to transfer text files a character at a time or a line at a time, contact your system administrator.

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receive them. In addition, the UNIX terminal driver may do unexpected things and give unpredictable results, such as lost characters. When this happens, your system administrator may need to change the UNIX terminal line speed characteristics.

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Chapter 4. Tailoring PC-Interface

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Introduction

The installation instructions in Appendix A combine all the PC-Interface files with the DOS operating system on a working diskette or on your fixed disk. You may not find it convenient to work with diskettes or to have all the PC-Interface files or other DOS applications you use on your local drive.

This chapter tells you how to tailor your installation to put PC-Interface where it is most convenient for your use. It also tells you how to create directories on the virtual drive for your DOS applications and how to access public directories to share DOS applications with other users.

This chapter also describes how to set certain environment variables that allow you to establish the way you want PC-Interface to perform certain functions. By setting these in your PC-Interface AUTOEXEC.BAT file, you can ensure that your PC-Interface environment is always the way you want it.

The PC-Interface Files

PC-Interface comprises fifteen files, all of which are installed on your working diskette or on your fixed disk when you follow the installation instructions in Appendix A. You must have some of these files in order to initialize PC-Interface; you need a few others to establish a connection to your UNIX host; and the rest provide additional utilities that extend the power of PC-Interface.

The following table lists the PC-Interface files:

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Files Required to Initialize PC-Interface	
AUTOEXEC.BAT	Invokes PCIINIT automatically when DOS is loaded.
BRIDGE.SYS	Provides basic PC-Interface support.
CONFIG.SYS	Identifies device drivers to be loaded by DOS.
LED.SYS	Ethernet device driver.
PCIINIT.EXE	Initializes PC-Interface.
Files Required for Host File Services	
LOGIN.EXE	Establishes a host connection for host file services.
LOGOUT.COM	Terminates a host file services session.
Files Required for Terminal Emulation	
EM.COM	Establishes a terminal emulation session.
PC-Interface Utilities	
DOS2UNIX.EXE	Converts text files in DOS format to UNIX format.
PRINTER.EXE	Directs output to local or remote printer.
UCHMOD.COM	Changes file permissions for files on virtual drive.
UDIR.EXE	Lists virtual drive directory contents in UNIX style.
UEXEC.EXE	Initiates execution of a UNIX process and reports process status.
UNIX2DOS.EXE	Converts text files in UNIX format to DOS format.
UREN.EXE	Renames UNIX files and directories that are inaccessible to DOS RENAME.

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Putting PC-Interface in a Subdirectory

When you install PC-Interface on your personal computer with a fixed disk according to the instructions in Appendix A, you can choose to install all the PC-Interface files in the root directory or to install some of them in a subdirectory. If you choose to install all the files in the root directory and later decide it would be more convenient to work from a subdirectory, you can relocate all the PC-Interface files, except AUTOEXEC.BAT and CONFIG.SYS, to a subdirectory. AUTOEXEC.BAT and CONFIG.SYS must remain in your root directory.

Use the following procedure to relocate PC-Interface files to a subdirectory:

1. Change your working directory to the root directory by typing:

```
cd  \
```

2. Create the subdirectory:

```
mkdir  pcibin
```

3. Copy all the PC-Interface files, except AUTOEXEC.BAT and CONFIG.SYS, to the new subdirectory one at a time. For example:

```
copy  dos2unix.exe  pcibin
```

4. Edit your AUTOEXEC.BAT file, adding the following line before the line containing the PCIINIT command:

```
path=c:\pcibin
```


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5. Modify the CONFIG.SYS file to insert the appropriate path qualifier before each DEVICE command. For example, change:

```
device=led.sys
```

to:

```
device=pcibin\led.sys
```

6. Erase the copied PC-Interface files from the root directory. For example:

```
erase  dos2unix.exe
```

Putting PC-Interface Files on the Virtual Drive

You need to keep only the files required to initialize PC-Interface and the files required for host file services on your local drive. The remaining files can be executed just as effectively from the virtual drive once you have established a host file services session. In fact, you can even put the LOGOUT program on the virtual drive.

If you want to establish terminal emulation sessions without first establishing a host file services session, you must also keep the EM.COM file on your local drive.

Use the following procedure to install the PC-Interface utilities and any other executable files you want on the virtual drive in your home directory:

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1. Initialize PC-Interface and establish a host file services session.

2. Change your current drive to the virtual drive by typing:

   ```
   c:
   ```

 (Substitute the drive specification PC-Interface returned when you logged in.)

3. Be sure your home directory is the current directory on the virtual drive by typing:

   ```
   cd
   ```

 Verify that the directory displayed is your home directory (or other directory in which you want to install PC-Interface files). If the current directory is not the one you want, use the CD command to change to the appropriate directory.

4. Change back to your local drive by typing:

   ```
   a:
   ```

 (or `c:` if your personal computer has a fixed disk.)

5. Copy the PC-Interface utility files one by one to the virtual drive. For example:

   ```
   copy  dos2unix.exe  c:
   ```

6. Erase the files you have copied from your working PC-Interface diskette. (You can restore them at any time by copying them back from the virtual drive or from your backup diskettes.)

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Often you want to consolidate frequently used commands or programs in a central, easily accessible directory. Since such directories usually contain only executable binary files, they are sometimes called *bin* directories (short for binary).

You can create a personal bin directory on your virtual drive (use the DOS MKDIR command to create a directory called PCIBIN) and copy the PC-Interface utilities to that directory instead of your home directory, using the same procedure described above.

Be sure your search path specifies these directories so DOS can find your PC-Interface files.

Putting DOS Applications on the Virtual Drive

You can also use personal bin directories on the virtual drive to contain your DOS applications. To install DOS applications on the virtual drive, first establish a host file services session, create a bin directory for the application, and change to that directory. Then, in most cases you can simply follow the manufacturer's instructions for installing the DOS application on a fixed disk.

Some DOS applications create or append to an existing AUTOEXEC.BAT file in the root directory to invoke the application automatically when you turn on your personal computer. When you install such an application on the virtual drive, this file is created on the virtual drive. However, since you do not have a connection to the virtual drive when you turn on your personal computer, the AUTOEXEC.BAT file cannot automatically start the application. You should rename the AUTOEXEC.BAT file to a unique name that suggests the

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application and has a .BAT extension (for example, STARTWS.BAT). Whenever you want to invoke the application, change your current directory to the bin directory in which you installed the application and type the file name without the extension. For example:

```
startws
```

Copy-protected DOS applications that require a "key" diskette in drive A: before they can be started from a fixed disk require the same "key" diskette when you invoke them from the virtual drive. Installing DOS applications on the virtual drive does not circumvent any copy-protection mechanism that may exist for the application.

You are responsible for observing the licensing restrictions associated with DOS applications you install on the virtual drive. Unless the licensing agreement permits you to share the software, you should only install applications in your own directories, and you should remove execute permission for all other users from those directories.

Public-domain software and DOS applications for which you have a multiuser licensing agreement can be installed in public bin directories on the virtual drive. Generally, the system administrator installs these packages and can tell you what applications are available at your installation and where they are. (We recommend that each application be installed in a separate subdirectory of \USR\PCI\PCBIN.)

Be sure your search path specifies these directories so DOS can find the applications.

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Setting Search Paths

In order to access PC-Interface utilities or DOS applications stored on the virtual drive, you have to tell DOS where to find them. You can do this each time you enter a command by first changing to the drive and directory that contain that command.

An easier way to tell DOS where to find commands is to set a search path. A path is a list of directory locations that you want DOS to search, in the order you specify, whenever DOS needs to find a command or program. You can specify a search path at any time using the DOS PATH command. This search path stays in effect until you issue another PATH command.

There are two very important things to remember when you specify directories on the virtual drive in your PATH command:

- You must have a host file services session in progress for DOS to search directories on the virtual drive.
- When you log out of a host file services session but plan to continue using DOS, you should reset your search path to exclude any references to the virtual drive.

If you relocated PC-Interface files to a subdirectory on your personal computer fixed disk, be sure you include the subdirectory any time you change the search path.

Setting a Default Search Path

To avoid having to remember to set your search path to include the virtual drive, you can include the PATH command

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in your AUTOEXEC.BAT file, specifying the virtual drive identifier PC-Interface normally returns to you at log in.

However, setting your PATH in AUTOEXEC.BAT has some disadvantages. First, it prevents you from being able to use your PC-Interface diskette until you reset the entire search path anytime the virtual drive specifier changes. It also forces you to reset the search path whenever you want to use DOS without establishing a host file services session.

When DOS uses the search path and encounters a drive specification for which it does not have access (for example, the virtual drive when no host file services session is in progress), DOS returns an "invalid drive" message and stops searching for the command or program you requested.

You can solve this problem by creating a default search path that you invoke only after you establish a host file services session, using the following procedure:

1. Establish a host file services session.

2. In your home directory on the virtual drive, create a file called SETPATH.BAT, which contains a PATH command in the following form:

   ```
   path=%1:\usr\pcibin;a:\
   ```

 Be sure to include all the directories you want DOS to search in the order in which you want them searched.

You can invoke the default search path as soon as you establish a host file services session by typing:

```
setpath c
```

where *c* is the virtual drive identifier. DOS substitutes this

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identifier for every %1 in the PATH command included in SETPATH.BAT and executes the command.

Setting the Terminal Emulation Environment Variable

When you leave a terminal emulation session without closing the session, PC-Interface creates a file called EM.SES that contains some number of screens of your session. PC-Interface uses this file to recreate your session screen when you reenter terminal emulation.

Normally, PC-Interface creates EM.SES on the drive and in the directory from which you invoked the EM command. If you change directories between one invocation of EM and the next, PC-Interface either finds a different EM.SES file and displays screens from a session other than the one you just left or finds no EM.SES file at all and displays a blank screen. Either way can be confusing.

You can tell PC-Interface that you always want the EM.SES file created and searched for in a particular location by including the following line in your AUTOEXEC.BAT file:

```
set emses=path
```

where *path* specifies the drive and directory.

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Chapter 5. Command Summary

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Introduction

This chapter presents a detailed description of the PC-Interface commands. The commands are presented in alphabetical order, and each description includes the purpose, format, and remarks about the command.

Command Notation

The following notational conventions are used to describe the format of PC-Interface commands:

[] Items shown inside square brackets are optional. To include optional items when you enter a command, type only the information inside the brackets. Do not type the brackets.

CAPS Words shown in capital letters are called *keywords*. The PC-Interface command names are keywords. You type keywords exactly as shown, although you can use either uppercase or lowercase letters when you issue the command from DOS. When a PC-Interface command is issued from UNIX, it must be entered in lowercase letters.

italics Items shown in lowercase italic letters indicate generic items for which you are to substitute an appropriate value. For example,

filename

indicates that you should type the name of your file in place of the word *filename*.

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Italic items shown inside of square brackets are optional.

| A vertical bar means either/or. Choose one of the separated items and type it as part of the command. For example,

ON|OFF

indicates that you should type either ON or OFF, but not both. Do not type the vertical bar.

. . . An ellipsis indicates that you can repeat the item.

Include all punctuation such as commas, equal signs, question marks, asterisks, colons, slashes, and backslashes. Punctuation shown inside square brackets is optional.

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DOS2UNIX Command

Purpose: The DOS2UNIX command converts a text file from DOS internal format—lines ending in a carriage-return and line-feed sequence and end-of-file marked with a CTRL-Z (octal 018)—to UNIX format—lines ending in a new-line sequence (ASCII line-feed). The command can be issued from either the DOS operating system or the UNIX operating system.

Format: **DOS2UNIX** [/B|/U|/L][/F] [[*path*]*filename*[.*ext*]] [[*path*]*filename*[.*ext*]]

Remarks: The first file specified is the source file. The second file specified is the target file. When neither file parameter is specified, DOS2UNIX reads from standard input and writes to standard output. When only one file parameter is specified, that file is considered the source file, and the output is written to standard output.

If the source file is already in UNIX style, DOS2UNIX does not alter the format of the file.

The /B, /U, and /L parameters are mutually exclusive. These parameters, which can be specified either before or after the file names, have the following meanings:

/B Preserves 8-bit (binary) character representations. When this parameter is not specified, DOS2UNIX truncates all characters to 7-bit ASCII representation.

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/U Converts text to uppercase.

/L Converts text to lowercase.

Note: When neither /U nor /L is specified, the case of each text character is unchanged.

DOS2UNIX normally removes all extra carriage-return characters preceding the end-of-line sequence before doing the end-of-line conversion. The /F parameter prevents the removal of these extra carriage returns and forces the translation of only the final carriage-return and line-feed sequence into a line feed. Although not normally used, this parameter preserves unusual end-of-line sequences when complete file invertibility is required.

When issued from the UNIX operating system, the /B, /U, /L, and /F parameters must be specified with the UNIX hyphen (-) rather than the DOS slash (/). From the DOS operating system, either the slash or the hyphen can be used.

DOS2UNIX can be used in combination with DOS and UNIX pipes and redirection. For example, the command:

```
dos2unix text | sort > newtext
```

converts the DOS file TEXT, sorts the text, and writes the sorted text to the UNIX file **newtext**.

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EM Command

Purpose: The EM command invokes the PC-Interface terminal emulator. In terminal emulation mode, PC-Interface makes your personal computer behave like a VT-100 terminal, allowing you to conduct a standard UNIX session.

Format: EM

Remarks: When you issue the EM command, you are presented with a choice of UNIX host connection paths over which to establish a terminal emulation session. When you establish a terminal emulation session over an RS-232 connection path that is not shared with a host file services session (COM1), you are also presented with a chance to alter certain default connection parameters.

Once your terminal emulation connection has been established, you log in to your UNIX host and conduct your UNIX session just as you would over a standard VT-100 terminal.

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LOGIN Command

Purpose: The LOGIN command initiates a PC-Interface host file services session.

Format: LOGIN [*host* [*username* [*password*]]]

Remarks: When you issue the LOGIN command, you are presented with a choice of UNIX hosts and connection paths over which to establish a host file services session. After you choose a host connection path, you are prompted for your UNIX user name and password.

When you log in over an Ethernet connection path, you can specify the host you want as part of the LOGIN command, bypassing the host-selection menu. You can include your user name or your user name and password as part of the command line. PC-Interface prompts you for user name and password if you omit them.

Once PC-Interface has established the host connection, LOGIN indicates the virtual drive on which the UNIX file system is available during the host file services session.

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LOGOUT Command

Purpose: The LOGOUT command terminates the PC-Interface host file services session.

Format: **LOGOUT**

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PCIINIT Command

Purpose: The PCIINIT command initializes PC-Interface software. When you install PC-Interface using the MKDISK program, PCIINIT is included in the AUTOEXEC.BAT file on your PC-Interface working diskette so that initialization occurs automatically when you start your personal computer.

Format: PCIINIT [-b*address*|-i*address*] [-x*n*] [-e]

Remarks: The -b and -i parameters are mutually exclusive. These parameters have the following meanings:

-b Indicates the Ethernet broadcast address (255.255.255.255.255.255) PC-Interface uses to send a broadcast request for a host-selection map. When you install PC-Interface with the MKDISK program, MKDISK prompts you for this address if you select installation for the Locus Ethernet or XENIX Ethernet environment.

-i Indicates the internet address of your personal computer in the following form:

xxx.xxx.xxx.xxx

where *xxx* is a number between 0 and 255.

When you install PC-Interface with the MKDISK program, MKDISK prompts you for this address if you select installation for a TCP/IP Ethernet environment.

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When neither the -b nor the -i parameter is specified, PC-Interface uses the default 3BNET multicast address (03.118.119.0.0.0) to send a broadcast request for a host-selection map. When you install PC-Interface with the MKDISK program, MKDISK uses this form if you select installation for the AT&T 3BNET environment.

The -e parameter echoes the current network address setting.

The -x*n* parameter indicates which interrupt channel the 3Com EtherLink board uses, where *n* equals the channel number plus an offset of 8. Omitting this parameter is equivalent to specifying -x11 (the default interrupt channel 3).

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PRINTER Command

Purpose: The PRINTER command indicates whether PC-Interface printing is directed to a local printer attached to your personal computer or to a remote UNIX printer.

Format: **PRINTER [LOCAL | REMOTE [/T[*n*]]]**

Remarks: The LOCAL parameter specifies that print requests are sent to a local printer attached to your personal computer. Local print requests can be issued in any one of the following ways:

- Using the DOS PRINT command.
- Using the print-screen key (PRT SC).
- Using the DOS COPY command and specifying the local printer device (PRN) as the target.
- Invoking the printer from an application program.

The REMOTE parameter specifies that print requests are sent to UNIX and spooled for printing on a remote printer attached to the UNIX system. Remote print requests can be issued in any one of the following ways:

- Using the print-screen key (PRT SC).
- Using the DOS COPY command and specifying the remote printer device (LPT1) as the target.
- Invoking the printer from an application program.

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Note that the DOS PRINT command is not supported with the REMOTE option.

When remote printing is in effect, print requests invoked from an application program are not executed until you exit the application unless you specify the /T parameter. The /T parameter indicates that printing should begin within *n* seconds if you do not exit the application sooner. The *n* can be any number between 5 and 360. When you omit *n*, the default timeout is 45 seconds.

The PRINTER command issued without either the LOCAL or REMOTE option displays the PRINTER option and timeout value currently in effect.

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UCHMOD Command

Purpose: The UCHMOD command changes the UNIX read, write, or execute permission mode of files or directories on the virtual drive. Only the owner of a file or directory can change the file's permission mode.

Format: **UCHMOD** *symbolicmode|absolutemode filename* [. . .]

Remarks: The filename parameter specifies the file or files for which UNIX read, write, and execute permissions are to be changed. You can also name a directory in the filename parameters.

You can specify the changes to UNIX read, write, and execute permissions either symbolically or absolutely, as follows:

Option 1 — Specify Permissions Symbolically

The *symbolicmode* parameter has the following form:

[*who*] *modeop permission* [,. . .]

You enter values for the *who*, *modeop*, and *permission* parameters without separating spaces. Various specifications for these parameters can be combined in one UCHMOD command; you separate the specifications with commas but no spaces, as shown in the following example:

```
uchmod u+x,o-wx file1
```

When you specify multiple operations in this way, the

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assignments are performed in the order specified.

The *who* parameter specifies the users to whom the new permissions apply. Values for this parameter have the following meanings:

u You, the file's owner.

g Anyone in the user group to which you belong.

o Other UNIX users, other than you and members of your user group.

a All UNIX users, including you and members of your user group.

You can specify values for the *who* parameter separately or in combination. For example:

```
uchmod ug+x file1
```

adds execute permission for you and members of your user group.

When the *who* parameter is omitted, permission defaults to **a**, all users.

The *modeop* parameter determines whether permissions are granted or denied. Values for this parameter have the following meanings:

+ Add the specified permission for the specified entity.

- Deny the specified permission to the specified entity.

= Assign only the permissions explicitly specified and deny all others.

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For example:

```
uchmod +x file1
```

adds execute permission for all users to the existing permission mode, leaving other permissions untouched. On the other hand, the following example:

```
uchmod =r file1
```

grants read permission to all users but changes the remainder of the permission mode to deny write and execute permission for all users.

The *permission* parameter specifies which permissions are granted or denied. Values for this parameter have the following meanings:[1]

r The file can be read.
w The file can be written to or modified.
x The file can be executed.

The *permission* parameter may only be omitted when the *modeop* parameter has a value of =. In this case, all permissions for all users are removed.

Option 2 — Specifying Permissions Absolutely

You specify absolute permissions in the following form:

numericstring

[1] Although they are not useful for PC-Interface users, the values s and t can also be specified for the *permission* parameter. These values have the same meanings as they do with the UNIX **chmod** command. For complete descriptions, refer to the *UNIX Programmer's Reference* manual.

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The numeric string consists of three digits, each between 0 and 7.[1] The leftmost digit sets the permissions for you, the owner. The second digit sets permissions for others in your user group; and the third digit sets permissions for all other UNIX users.

The digits 0 through 7 have the following meanings:

7 Read, write, and execute permission
6 Read and write permission only
5 Read and execute permission only
4 Read permission only
3 Write and execute permission only
2 Write permission only
1 Execute permission only
0 All permissions denied

Notice that you can obtain the values for combination permissions by adding the values for single permissions. For example, read permission (4) and write permission (2) are indicated by the value 6 (4 + 2).

Example: To grant yourself read and write permission and all others only read permission for FILE2, you can issue either of the following commands:

```
uchmod a+rw,go-wx file2
```

or

```
uchmod 644 file2
```

[1] A four-digit numeric string can be used, in which the leftmost digit indicates the settings that correspond to the symbolic **s** and **t** values mentioned above. Refer to the **chmod** command in the *UNIX Programmer's Reference* manual for a description of this form.

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UDIR Command

Purpose: The UDIR command lists the contents of directories on the virtual drive in a combination of UNIX and DOS style, displaying both UNIX and mapped names, owner, file permissions, size, and modification date and time for each file or directory.

Format: **UDIR** [*d:*][*path*][*filename*[*.ext*]]

Remarks: When the drive parameter is used, it should specify the virtual drive.

The filename parameter can specify either a file or directory. Directories are indicated in the UDIR display with both an initial d in the permission field and the <DIR> notation.

File and directory names are entered in the UNIX form. The UDIR display shows all the file and directory names in both their UNIX and mapped-name form. You can also use the global characters * and ? in the parameters; however, UDIR interprets these as DOS does, not as UNIX does.

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UEXEC Command

Purpose: The UEXEC command executes UNIX processes from DOS during a host file services session.

Format: **UEXEC** [-n] [-] [*environvar=value* . . .]
unixcommand [*arg1* [. . . *argn*]]

UEXEC -c|-s [-n] [-] [*environvar=value* . . .]
"*commandstring*"

UEXEC -w

Remarks: When you issue the first form of the UEXEC command, *unixcommand* is executed using any arguments specified. Full path names on the virtual drive can be given for UNIX commands; the default search paths are **/bin** and **/usr/bin**. UEXEC returns the UNIX process identification number (PID) in decimal and waits for the command to finish.[1]

To avoid having to wait for the UNIX process to finish before continuing your work, use the -n option. Using this option, you can start up to 16 processes. However, since you may need to kill a process, you should never start more than 15 processes so that you have one in reserve to UEXEC a **kill** process.

[1] If the command process fails to complete either successfully or unsuccessfully, UEXEC continues to wait and you cannot regain control except by rebooting your personal computer. Therefore, it is usually more convenient to issue the UEXEC with the -n option.

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When an executed UNIX process for which you are waiting (no -n option) completes, the process status is reported in hexadecimal. Successful processing returns hexadecimal 00. Any other status indicates an error. (Refer to the **exec** command entry in the *UNIX Programmer's Manual* for an explanation of process return codes).

When you receive the process status in this way, you also receive the process status for any completed processes you previously executed with UEXEC and the -n option but for which you have not executed a UEXEC with the -w option (see the discussion of the third form of UEXEC below).

No I/O redirection or metacharacters are allowed with this form of UEXEC, and the UNIX standard input (**stdin**), errors (**stderr**), and output (**stdout**) are directed to the file **/dev/null**.

The second form of the UEXEC command causes UNIX to **exec** a shell with the *commandstring*. This form allows the use of I/O redirection and shell metacharacters.

The command string must be the last item on the command line and may contain any command, with optional arguments, shell metacharacters, and I/O redirection specifications. When the command string contains more than one word, it must be enclosed in quotes. For example:

```
uexec -c "ls -l > filelist"
```

The two shell options, -c and -s, are mutually exclusive. These options have the following meanings:

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-c Invokes the command string with the C shell. (The file **/bin/csh** must exist for your UNIX system.)

-s Invokes the command string with the default system shell.

When you execute a UNIX process with a shell, UEXEC automatically prefaces the command string with the **exec** command. Therefore, the process identification number and process status that UEXEC returns are those of the command.

For either form, UEXEC points to the same environment used by the PC-Interface **dossvr** process. To specify no environment, use the - option without specifying environment variable values. To redefine the environment, use the - option and set the environment variables specifically. To add an environment variable to the default environment, omit the - option and specify only the environment variable to be added. For example:

```
uexec -s HOME=/usr/home "ls -l > $HOME/temp.file"
```

To find the status of a UNIX process you executed with the -n option, you issue the third form of the UEXEC command with the -w option, as follows:

```
uexec -w
```

This form of the UEXEC command displays the process status for the first completed process in a stack of processes started with a -n option. Each time you issue the UEXEC command with the -w option, the next completed process in the stack is displayed.

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Note that when you use the -w option, you cannot specify any other options or parameters.

When you log out of PC-Interface or reboot your personal computer, any process running on the UNIX host are killed.

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UNIX2DOS Command

Purpose: The UNIX2DOS command converts a text file from UNIX internal format—lines ending in a new-line sequence (ASCII line-feed)—to DOS format—lines ending in a carriage-return and line-feed sequence and end-of-file marked with a CTRL-Z (octal 018). The command can be issued from either the DOS operating system or the UNIX operating system.

Format: **UNIX2DOS** [/B|/U|/L][/F] [[*path*]*filename*[.*ext*]] [[*path*]*filename*[.*ext*]]

Remarks: The first file specified is the source file. The second file specified is the target file. When neither file parameter is specified, UNIX2DOS reads from standard input and writes to standard output. When only one file parameter is specified, that file is considered the source file, and the output is written to standard output.

If the source file is already in DOS style, UNIX2DOS does not alter the format of the file.

The /B, /U, and /L parameters are mutually exclusive. These parameters, which can be specified either before or after the file names, have the following meanings:

/B Preserves 8-bit (binary) character representations. When this parameter is not specified, UNIX2DOS truncates all characters to 7-bit ASCII representation.

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/U Converts text to uppercase.

/L Converts text to lowercase.

Note: When neither /U nor /L is specified, the case of each text character is unchanged.

UNIX2DOS normally removes all extra carriage-return characters preceding the end-of-line sequence before doing the end-of-line conversion. The /F parameter prevents the removal of these extra carriage returns and forces the translation of each line-feed into a carriage-return and line-feed pair, even when a carriage return is already present. Although not normally used, this parameter preserves unusual end-of-line sequences when complete file invertibility is required.

When issued from the UNIX operating system, the /B, /U, /L, and /F parameters must be specified with the UNIX hyphen (-) rather than the DOS slash (/). From the DOS operating system, either the slash or the hyphen can be used.

UNIX2DOS can be used in combination with DOS and UNIX pipes and redirection. For example, the command:

```
unix2dos textfile | sort > newtext
```

converts the UNIX file **textfile**, sorts the text, and writes the sorted text to the DOS file NEWTEXT.

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UREN Command

Purpose: The UREN command renames files on the virtual drive. It differs from the DOS RENAME command in that it accepts UNIX style names for either the source or target file, allows the renaming of directories, and changes files or directories from one path to another.

Format: **UREN** [*d:*][*path*]*filename*[*.ext*] [*path*]*filename*[*.ext*]

Remarks: The UREN command changes the name of the file specified in the first parameter to the name and extension given in the second parameter. You specify the UNIX style name, not the DOS mapped name, for the file name parameters. You can also specify directory names for either parameter.

When the drive parameter is used for the first file name parameter, it should specify the virtual drive. The second file name must also be on the virtual drive, and no drive parameter is needed.

When the path parameter on the first file name parameter differs from the path parameter on the second file name parameter, the UREN command changes the directory of the first file in the same manner as the UNIX **mv** command.

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Appendix A. Installing PC-Interface

This appendix describes how to combine the PC-Interface files from the distribution diskette with your DOS files to create a working PC-Interface diskette or to install PC-Interface on your personal computer with a fixed disk.

Your PC-Interface distribution diskette is in a plastic jacket at the back of this manual. The diskette contains the programs necessary to establish a host file services session and the program you need for terminal emulation. The PC-Interface distribution diskette does not contain the DOS files needed to start the system and load the PC-Interface programs.

PC-Interface is copy-protected. You may use the distribution diskette to create backup and working copies for your own use only.

This appendix describes, step by step, how to format a blank diskette with the DOS operating system files, back up your PC-Interface distribution diskettes, and then create a working PC-Interface diskette or install PC-Interface on your fixed disk.

These steps are described separately for three different personal computer configurations:

- A personal computer with two double-sided diskette drives.
- A personal computer with a fixed disk drive.
- A personal computer with one double-sided diskette drive.

Refer to the section of the appendix that corresponds to your personal computer configuration.

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Two Diskette Drive System

Follow these instructions to format a diskette with the DOS operating system files, back up your PC-Interface distribution diskette, and then combine the two into a working diskette. (For further information on the commands used in this procedure, refer to your *Disk Operating System* manual).

For this procedure, you need the following:

- A personal computer with two double-sided diskette drives.
- Two blank double-sided, double-density diskettes.
- Your DOS system diskette.
- Your PC-Interface distribution diskette.

You also need the following information, usually available from your system administrator:

- Your networking environment—AT&T 3BNET, Locus Ethernet, XENIX Ethernet, or TCP/IP Ethernet.
- If TCP/IP Ethernet, your personal computer's internet address.

Making a Backup Diskette

1. Use a felt-tip pen and label one of the blank diskettes PC-INTERFACE WORKING. Label the other blank diskette PC-INTERFACE BACKUP.
2. Insert your DOS system diskette into diskette drive A:.
3. Switch ON your system unit if you have not already done

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so. If the system unit is already ON, press and hold the CTRL and ALT keys; then press the DEL key (system reset). Release all three keys.

4. DOS asks for today's date; enter the date.

5. DOS asks for the time; enter the time.

 A message similar to the following appears:

```
Microsoft MS-DOS version 2.11
Copyright 1981,82,83 Microsoft Corp.

A>
```

6. Type:

```
format b: /s
```

7. Press Enter (↵).

 The following message appears:

```
Insert new diskette for drive B:
and strike any key when ready
```

8. Insert the blank WORKING diskette in drive B:.

 Press any key. When the FORMAT procedure is completed, the following message appears:

```
Formatting. . .Format complete

  xxxxxx bytes total disk space
   xxxxx bytes used by system
  xxxxxx bytes available on disk

Format another (Y/N)?
```


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9. Type:

   ```
   y
   ```

 Press Enter (↵).

10. Remove the formatted WORKING diskette from drive B: and set it aside. You will install the PC-Interface files later.

11. Type:

    ```
    diskcopy
    ```

12. Press Enter (↵).

 The following message appears:

    ```
    Insert source diskette in drive A:
    Insert target diskette in drive B:
    Strike any key when ready
    ```

13. Remove the DOS system diskette from drive A: and store it in a safe place.

14. Insert the PC-Interface distribution diskette in drive A:. Insert the blank BACKUP diskette in drive B:.

15. Press any key. The "in use" lights alternately come on while the PC-Interface distribution diskette is being copied.

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16. When the copying is complete, the following message appears on your screen:

```
Copy complete

Copy another (Y/N)?
```

Type:

```
n
```

The following message appears:

```
Insert COMMAND.COM disk in drive A and
strike any key when ready
```

17. Remove the PC-Interface distribution diskette from drive A: and store it in a safe place.

18. Remove the PC-Interface BACKUP diskette from drive B: and set it aside for now.

19. Insert the PC-Interface WORKING diskette in drive A:.

20. Press any key. The DOS prompt A> appears.

Installing PC-Interface

1. Insert your PC-Interface BACKUP diskette in drive B:.

2. Type:

```
b:
```

Press Enter (↵).

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3. Type:

```
mkdisk
```

The following message appears:

```
Mkdisk, Copyright (c) 1985 Locus Computing
Corporation

What drive is the system disk on (default A:)?
```

(If you received an "error opening configuration file" message instead, you probably missed step 2. Change the current drive to B: and repeat step 3.)

4. Press Enter (↵).

The following message appears:

```
Network types available:

    (1) AT&T 3BNET
    (2) Locus Ethernet
    (3) TCP/IP Ethernet
    (4) XENIX Ethernet
    (5) RS-232 Only

Enter the number corresponding to your
network type.
```

5. Choose the appropriate Ethernet environment (or RS-232 Only if your personal computer does not have an Ethernet connection) and type the corresponding number.

Press Enter (↵).

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6. If you entered 1, 2, 4, or 5, go to step 7. If you entered 3, the following message appears:

```
Enter the internet address of your PC
in the form A.B.C.D:
```

Type your internet address and press Enter (↵).

7. The following message appears:

```
Do you want to install the full
PC-Interface system?[y]
```

Type:

```
y
```

Press Enter (↵).

8. MKDISK displays the following message:

```
Installing full PC-Interface system.
```

This message is followed by a list of the PC-Interface files being copied to your WORKING diskette.

9. When all the files are copied, remove the BACKUP diskette from drive B: and store it in a safe place.

10. If your 3Com EtherLink board is configured to use interrupt channel 5 instead of the default interrupt channel 3, edit the AUTOEXEC.BAT file, adding the following option to the end of the PCIINIT command line:

```
-x13
```


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Your PC-Interface WORKING diskette is ready to use. If you want to proceed with a PC-Interface session, hold down the CTRL and ALT keys and press the DEL key to reset your personal computer and initialize PC-Interface.

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Fixed Disk Drive

Follow these instructions to back up your PC-Interface distribution diskette and combine the PC-Interface programs with DOS on your fixed disk. (For further information on the commands used in this procedure, refer to your *Disk Operating System* manual.)

If you prefer to use PC-Interface on diskette, refer to the section with the diskette configuration that matches your system.

We assume that you have set up a DOS partition on your fixed disk and have copied DOS into that partition.

For this procedure, you need the following:

- A personal computer with at least one double-sided diskette drive and a fixed disk.
- One blank double-sided, double-density diskette.
- Your PC-Interface distribution diskette.

You also need the following information, usually available from your system administrator:

- Your networking environment—AT&T 3BNET, Locus Ethernet, XENIX Ethernet, or TCP/IP Ethernet.
- If TCP/IP Ethernet, your personal computer's internet address.

Making a Backup Diskette

1. Use a felt-tip pen and label the blank diskette PC-INTERFACE BACKUP.

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2. Keeping the door open on diskette drive A:, switch ON your system unit if you have not already done so. If the system unit is already ON, press and hold the CTRL and ALT keys; then press the DEL key. Release all three keys.

 Note: Steps 1 through 4 bring up the DOS prompt. If your existing AUTOEXEC.BAT file causes your system to load some program other than DOS, bring up the DOS prompt C> and continue with step 5.

3. DOS asks for today's date; enter the date.

4. DOS asks for the time; enter the time.

 A message similar to the following appears:

```
Microsoft MS-DOS version 2.11
Copyright 1981,82,83 Microsoft Corp.

C>
```

5. Type:

```
diskcopy a: a:
```

 Press Enter (↵).

 The following message appears:

```
Insert source diskette in drive A:

Strike any key when ready
```

6. Insert the PC-Interface distribution diskette in drive A: For this procedure, use the PC-Interface distribution diskette as your "source" diskette.

 With only one diskette drive, you must exchange diskettes

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during the DISKCOPY procedure. A message appears on your screen when an exchange is needed.

Press any key. The "in use" light comes on while the PC-Interface distribution diskette is read; the following message is then displayed:

```
Insert target diskette in drive A:
Strike any key when ready
```

7. Remove your PC-Interface distribution diskette and insert the blank BACKUP diskette. Use the BACKUP diskette as the "target" diskette.

8. Press any key.

 The "in use light comes on while the BACKUP diskette is written. The screen continues to ask for the source and target diskettes until the copy is complete. Follow the messages on your screen until the following message appears:

```
Copy complete
Copy another (Y/N)?
```

9. Type:

```
n
```

 Your PC-Interface backup is complete. Store your original PC-Interface distribution diskette in a safe place, and use the backup for the rest of the installation procedure.

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Installing PC-Interface

1. Type:

   ```
   a:
   ```

 Press Enter (↵).

2. Type:

   ```
   mkdisk
   ```

 Press Enter (↵).

 The following message appears:

   ```
   Mkdisk, Copyright (c) 1985 Locus Computing
   Corporation
   What drive is the system disk on (default A:)?
   ```

 (If you received an "error opening configuration file" message instead, you probably missed step 1. Change the current drive to A: and repeat step 2.)

3. Type:

   ```
   c:
   ```

 Press Enter (↵).

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The following message appears:

```
Network types available:

    (1) AT&T 3BNET
    (2) Locus Ethernet
    (3) TCP/IP Ethernet
    (4) XENIX Ethernet
    (5) RS-232 Only

Enter the number corresponding to your
network type:
```

4. Choose the appropriate Ethernet environment (or RS-232 Only if your personal computer does not have an Ethernet connection) and type the corresponding number.

 Press Enter (↵).

5. If you entered 1, 2, 4, or 5, go to step 6. If you entered 3, the following message appears:

   ```
   Enter the internet address of your PC
   in the form A.B.C.D:
   ```

 Type your internet address and press Enter (↵).

6. The following message appears:

   ```
   Do you want to install the full PC-
   Interface system?[y]
   ```

7. Type:

   ```
   y
   ```

 Press Enter (↵).

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MKDISK displays the following message:

```
Do you want to install PC-Interface utilities
in a subdirectory?[y]
```

8. Type:

   ```
   y
   ```

 Press Enter (↵).

 MKDISK prompts for a path name for the subdirectory, as follows:

   ```
   Enter path: C:\
   ```

9. Enter the name of the subdirectory in which you want PC-Interface utilities installed.

 MKDISK displays the following message:

   ```
   Installing full PC-Interface system.
   ```

 This message is followed by a list of the PC-Interface files being copied to your fixed disk.

10. When all the files are copied, remove the BACKUP diskette from drive A: and store it in a safe place.

11. During installation, MKDISK appended the PCIINIT command to your AUTOEXEC.BAT file (if one existed) after copying the original contents of AUTOEXEC.BAT to AE.BAT. In addition, MKDISK appended appropriate DEVICE= commands to your CONFIG.SYS file (if one existed) after copying the original contents of CONFIG.SYS to CF.SYS. You can delete AE.BAT and CF.SYS if you want.

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12. If your 3Com EtherLink board is configured to use interrupt channel 5 instead of the default interrupt channel 3, edit the AUTOEXEC.BAT file, adding the following option to the end of the PCIINIT command line:

```
-x13
```

PC-Interface is ready to use. If you want to proceed with a PC-Interface session, hold down the CTRL and ALT keys and press the DEL key to reset your personal computer and initialize PC-Interface.

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One Diskette Drive System

Follow these instructions to format a diskette with the DOS operating system files, back up your PC-Interface distribution diskette, and then combine the two into a working diskette. (For further information on the commands used in this procedure, refer to your *Disk Operating System* manual).

For this procedure, you need the following:

- A personal computer with one double-sided diskette drive.
- Two blank double-sided, double-density diskettes.
- Your DOS system diskette.
- Your PC-Interface distribution diskette.

You also need the following information, usually available from your system administrator:

- Your networking environment—AT&T 3BNET, Locus Ethernet, XENIX Ethernet, or TCP/IP Ethernet.
- If TCP/IP Ethernet, your personal computer's internet address.

Making a Backup Diskette

1. Use a felt-tip pen and label one of the blank diskettes PC-INTERFACE WORKING. Label the other blank diskette PC-INTERFACE BACKUP.
2. Insert your DOS system diskette into the diskette drive.

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3. Switch **ON** your system unit if you have not already done so. If the system unit is already **ON**, press and hold the CTRL and ALT keys; then press the DEL key (system reset). Release all three keys.

4. DOS asks for today's date; enter the date.

5. DOS asks for the time; enter the time.

 A message similar to the following appears:

```
Microsoft MS-DOS version 2.11
Copyright 1981,82,83 Microsoft Corp.
A>
```

6. Type:

```
format  a: /s
```

7. Press Enter (↵).

 The following message appears:

```
Insert new diskette for drive A:
and strike any key when ready
```

8. When the drive A: "in use" light is off, remove the DOS diskette from drive A: and insert the blank WORKING diskette in the drive.

9. Press any key.

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When the FORMAT procedure is completed, the following message appears:

```
Formatting. . .Format complete

  xxxxxx bytes total disk space
   xxxxx bytes used by system
  xxxxxx bytes available on disk

Format another (Y/N)?
```

10. Type:

    ```
    n
    ```

 Press Enter (↵).

11. Remove the WORKING diskette from the drive and set it aside. You will merge the PC-Interface files later.

12. Insert your DOS system diskette in the diskette drive and type:

    ```
    diskcopy
    ```

13. Press Enter (↵).

 The following message appears:

    ```
    Insert source diskette in drive A:

    Strike any key when ready
    ```

14. Remove the DOS diskette from the drive, and insert your PC-Interface distribution diskette. For this procedure, use the PC-Interface distribution diskette as your "source" diskette.

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With only one diskette drive, you must exchange diskettes during the DISKCOPY procedure. A message appears on your screen when an exchange is needed.

15. Press any key. The "in use" light comes on while the PC-Interface distribution diskette is read; the following message is then displayed:

```
Insert target diskette in drive A:

Strike any key when ready
```

16. Remove your PC-Interface distribution diskette and insert the blank BACKUP diskette. Use the BACKUP diskette as the "target" diskette.

17. Press any key.

18. The "in use" light comes on while the PC-Interface BACKUP diskette is written. The screen continues to ask for the source and target diskette until the copy is complete. Follow the messages on your screen until the following message appears:

```
Copy complete

Copy another (Y/N)?
```

Type:

```
n
```

The following message appears:

```
Insert COMMAND.COM disk in drive A
and strike any key when ready
```


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19. Your PC-Interface BACKUP disk is complete. Remove it from the drive and set it aside. Store your original PC-Interface distribution diskette in a safe place.

20. Insert the WORKING diskette in the diskette drive.

21. Press any key. The DOS prompt A> appears.

Installing PC-Interface

1. Remove the PC-Interface WORKING diskette from the diskette drive and insert the PC-Interface BACKUP diskette.

 During the following procedure, you will be entering several COPY commands. With only one diskette drive, you must exchange diskettes during each COPY procedure. A message appears on your screen when an exchange is needed.

 COPY messages read as if you have two drives instead of one. Think of the messages as referring to diskettes instead of drives.

 During this procedure, your BACKUP diskette is the drive A: diskette and the WORKING diskette is the drive B: diskette.

 Each time you enter the COPY command, your BACKUP diskette should be in the diskette drive. The "in use" light comes on while a PC-Interface file is being read; the following message is then displayed:

   ```
   Insert diskette for drive B: and strike
   any key when ready
   ```


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Remove your BACKUP diskette and insert the WORKING diskette. Press any key. The "in use" light comes on while the file is being written. Continue switching diskettes as instructed until the requested files are copied.

When copying is done, the DOS prompt A> appears. Be sure your BACKUP diskette is in the drive before you issue the next COPY command.

2. Copy the configuration files by typing the COPY command that corresponds to your networking environment:

 For AT&T 3BNET or Locus Ethernet, type:

   ```
   copy a:*.eth b:*.sys
   ```

 For TCP/IP Ethernet, type:

   ```
   copy a:*.ip b:*.sys
   ```

 For XENIX Ethernet, type:

   ```
   copy a:*.xnx b:*.sys
   ```

 For RS-232 only, type:

   ```
   copy a:bridge.eth b:*.sys
   ```

 Press Enter (↵).

3. Copy the remaining PC-Interface files by typing:

   ```
   copy a:*.exe b:*.*
   ```

 Press Enter (↵).

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Type:

```
copy a:*.com b:*.*
```

Press Enter (↵).

4. Remove your BACKUP diskette and store it in a safe place. Insert your PC-Interface WORKING diskette in the drive.

5. Create an AUTOEXEC.BAT file corresponding to your networking environment, as follows (press Enter after each line):

 For AT&T 3BNET and RS-232, type:

   ```
   copy con autoexec.bat
   pciinit
   ```

 For Locus Ethernet and XENIX Ethernet, type:

   ```
   copy con autoexec.bat
   pciinit -b255.255.255.255.255.255
   ```

 For TCP/IP Ethernet, type:

   ```
   copy con autoexec.bat
   pciinit -ix.x.x.x
   ```

 where *x.x.x.x* is your internet address.

6. Press the F6 function key.

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7. Create a CONFIG.SYS file appropriate to your networking environment, as follows (press Enter after each line):

 For all Ethernet environments, type:

   ```
   copy con config.sys
   device=led.sys
   device=bridge.sys
   ```

 For RS-232 only, type:

   ```
   copy con config.sys
   device=bridge.sys
   ```

8. Press the F6 function key.

9. If your 3Com EtherLink board is configured to use interrupt channel 5 instead of the default interrupt channel 3, edit the AUTOEXEC.BAT file, adding the following option to the end of the PCIINIT command line:

   ```
   -x13
   ```

Your PC-Interface WORKING diskette is ready to use. If you want to proceed with a PC-Interface session, hold down the CTRL and ALT keys and press the DEL key to reset your personal computer and initialize PC-Interface.

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Appendix B. Messages

This appendix lists all messages that PC-Interface programs can generate. These messages appear in alphabetical order to facilitate your locating the message you want. Each mesage entry includes the exact wording of the message and a complete description including the cause and recommended user response.

This appendix does not list DOS messages. If your message does not appear in this appendix, check your DOS manual or contact your system administrator.

- **Access Denied**

Explanation: The specified file is inaccessible because the user invoking it does not own the file or a directory on the path to the file is not executable.

User Response: Check that you own the file. Check that the directory containing the file and all directories on the path to the file have execute permission.

- **An error has occurred while reading input file**

Explanation: The source file is corrupted or there was an operating system error.

User Response: Check the integrity of the source file. If it does not appear to be corrupted, retry the operation. If the error occurs again, consult your system administrator.

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- **An error has occurred while writing output file**

Explanation: This message can be caused by any of the following:

- Insufficient disk space to accommodate the target file.
- Incorrect UNIX permission mode for the target directory.
- An operating system error.

User Response: Verify whether there is room on your disk or diskette for the target file. If necessary, delete unneeded files. If there is adequate space for the target file, check the UNIX permission mode of the target directory and any directories on the path to the target directory. The target directory must be writable and executable, and directories on the path to the target directory must be executable. If these measures do not solve the problem, consult your system administrator.

- **Bad argument**

Explanation: PCIINIT options are specified incorrectly.

User Response: Retry the PCIINIT command specifying the options with a hyphen (-) and in lowercase.

- **Both names must be on the same drive**

Explanation: Different drives were specified for the source and target files with the UREN command.

User Response: Invoke UREN using the virtual drive specifier for the source file and omitting the drive specifier for the target file.

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- **Can't open input file**

Explanation: The source file does not exist or is not accessible.

User Response: Check that the source file exists and is named correctly. Check that the file is readable. Check that the directory containing the source file and any other directories on the path to the source file are executable.

- **Can't open output file**

Explanation: The target file cannot be opened, because the directory containing it is not executable and writable, because a directory on the path to the target directory is not executable, or because the target file already exists and is write-protected.

User Response: Check that the target directory is writable and executable. Check that all directories on the path to the target directory are executable. Check whether a file already exists with the name of the target file. If you intend to replace an existing file with the new file created by DOS2UNIX or UNIX2DOS, the existing file must have write permission. Instead of replacing an existing file, you can choose a different name for the DOS2UNIX or UNIX2DOS target file.

- **Cannot find correct BRIDGE device**

Explanation: The PC-Interface device driver was not successfully loaded.

User Response: Check that your PC-Interface working disk contains the BRIDGE.SYS and CONFIG.SYS files. If either file is missing, reinstall PC-Interface working on your working disk from the distribution diskette. Check that the

CONFIG.SYS file properly specifies the location of BRIDGE.SYS. Retry the operation.

- **Cannot open session, error 3**

Explanation: This message appears after the list of available hosts has been displayed and the user selects a host for an emulation session. The host may have gone down between the time the list was displayed and the time the user selected that host. There may also be a communication problem between the personal computer and the host.

User Response: Retry the operation. If the problem persists, consult your system administrator.

- **Chmod failed**

Explanation: System error.

User Response: Retry the operation. If the problem persists, see your system administrator.

- **Error in initialization**

Explanation: The PC-Interface device driver was not successfully loaded.

User Response: Check that your PC-Interface working disk contains the BRIDGE.SYS and CONFIG.SYS files. If either file is missing, reinstall PC-Interface on your working disk from the distribution diskette. Check that the CONFIG.SYS file properly specifies the location of BRIDGE.SYS. Retry the operation.

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- **File Not Found**

Explanation: The file you specified does not exist in the current or specified directory, or a directory on the path to the file is not executable.

User Response: Check the name of the specified file, make sure it exists in the current or specified directory, and make sure that all directories on the path to the file have execute permission.

- **Filename Must Be Specified**

Explanation: UCHMOD was invoked without specifying the name of the file to be operated on.

User Response: Retry the operation with the file name specified.

- **Invalid combination of options**

Explanation: The DOS2UNIX or UNIX2DOS options are combined in an illegal way. The /B, /U, and /L options are mutually exclusive.

User Response: Retry the operation with a legal combination of options.

- **Invalid Drive**

Explanation: The specified drive does not exist or is inaccessible, or a drive other than the UNIX drive was specified.

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User Response: Check that you are specifying the UNIX drive when referring to the file to be changed by UCHMOD. Make sure that the UNIX drive is accessible.

- **Login Aborted**

Explanation: This message appears when you interrupt the log in process over an RS-232 connection path by pressing F10 or when you answer no to the Login Incorrect. Try Again? prompt. The message acknowledges that the process has been aborted, as requested by the user.

User Response: None.

- **Login Incorrect. Try Again? (y or n)**

Explanation: Your user name or password was entered incorrectly.

User Response: Type y or n. If you choose y to retry the log in operation, type your user name and password carefully. If your log in is still unsuccessful, consult the system administrator.

- **No Hosts Available For Service**

Explanation: The UNIX hosts cannot accommodate any additional users.

User Response: This is a host system problem. Consult your system administrator.

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• **PC-Interface Copy Protection Violation - SYSTEM DISABLED**

Explanation: Two personal computer users attempted to use copies of the same PC-Interface distribution disk to log into PC-Interface simultaneously. The first user to log in is unaffected. The second user attempting to log in receives this message.

User Response: The disabled personal computer must be powered off and powered on again to be usable. Do not attempt to log in to PC-Interface using a duplicate disk. Simultaneous PC-Interface sessions can be established only by using a unique working disk for each session.

• **PC-Interface Logged Out**

Explanation: This message appears whenever the LOGOUT command is issued.

User Response: None.

• **PC-Interface Not Initialized**

Explanation: The LOGIN command was invoked before PC-Interface was initialized.

User Response: Initialize PC-Interface using the PCIINIT command. Then retry the LOGIN command.

• **PC-Interface session terminated. Login to retry.**

Explanation: When you attempt to log in to PC-Interface, there are several possible error conditions that result in failure

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of the log in. When such a failure occurs, an error message describes the problem and, in some cases, prompts you with the question "Try Again?" If you answer no to this question, the system displays the message "PC-Interface session terminated. Login to retry."

User Response: No action is required. If you wish to retry the operation, begin by typing the LOGIN command and proceed as before.

- **Parameter Error**

Explanation: An invalid parameter was entered.

User Response: Read the description of the UCHMOD command in this manual and make sure you are specifying a legal absolute or symbolic mode.

- **Path Not Found**

Explanation: The path specifying the location of the file does not exist.

User Response: Verify the location of the file and enter the path in the correct form.

- **Selected Baud Rate Invalid -- Try Again? (y or n):**

Explanation: An invalid baud rate was specified for an RS-232 path connection.

User Response: Type y or n. If you type y to retry the operation, enter a valid baud rate chosen from the baud rates shown.

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- **Selected Host Not Available. Try Another? (y or n):**

Explanation: The selected host cannot accommodate any additional users, or there was a communication failure between the personal computer and the host.

User Response: Type y or n. If you type y to retry the operation, you can select a different host to log in to. If you prefer, you can attempt to make the selection that caused the error message. If the problem persists, consult your system administrator.

- **Selected Host Not In Table -- Try Again?**

Explanation: An invalid response, including a carriage return, was given to the host-selection menu for host file services.

User Response: Type y or n. If you type y to retry the operation, give a valid host identification chosen from the host menu.

- **The PC-Interface hosts are not available**

Explanation: An emulation session cannot be started because no hosts are available. This could be a host problem or a problem in the communication link between the personal computer and the hosts.

User Response: Retry the operation. If the problem persists, consult your system administrator.

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- **The PC-Interface software is not initialized**

Explanation: An attempt was made to invoke the emulator before PC-Interface was initialized. PC-Interface must be initialized before invoking the emulator.

User Response: Initialize PC-Interface using the PCIINIT command.

- **There are more hosts, but they don't fit on the screen**

Explanation: This message refers to the list of available hosts that appears on the user's screen when the emulator is invoked. There are more hosts than can be listed on the screen.

User Response: None.

- **There is not enough memory for a new session**

Explanation: The personal computer memory is inadequate.

User Response: Retry the operation. If the message persists, install additional memory in your personal computer.

- **Unknown switch**

Explanation: An invalid PCIINIT option is specified

User Response: Read the description of PCIINIT in this manual and retry the operation with valid options.

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Appendix C. Using a Dial-Up Modem

You can use PC-Interface with a dial-up modem connection to a UNIX host in the same way that you use a direct RS-232 connection.

Since there are many kinds of dial-up modems and the exact steps they require for establishing communications vary, it exceeds the scope of this appendix to document the procedure in detail. However, in general, the steps are similar. Once PC-Interface initializes the communications port, you make a telephone connection to your UNIX host. If you are using an automatic-dialing modem, you instruct the modem to dial the number from the keyboard. If you are using a manual modem, you dial the number and transfer control of the line to the modem after receiving a data tone.

This appendix describes these general steps using the internal Hayes Smartmodem for illustration. You should refer to the product manual for your dial-up modem for details on its operation.

When you plan to use a dial-up modem, you should install PC-Interface for RS-232 (following the installation instructions in Appendix A).

Before beginning your PC-Interface session, be sure your modem is attached to, or installed correctly in, your personal computer and that it is connected to a standard telephone jack.

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Establishing a Host File Services Session

The following procedure illustrates logging in to a host file services session:

1. Boot your personal computer using your PC-Interface disk.

2. Log in to PC-Interface by typing the LOGIN command.

3. Choose the PCI-RS232 Port connection path.

4. Choose the baud rate appropriate for your modem. The internal Hayes Smartmodem uses 1200 baud.

5. When the five-line log-in window appears, it remains blank. Establish the telephone connection to your UNIX host.

 With the Hayes Smartmodem, type:

 `AT DT` *number*

 where *number* is the telephone number of your UNIX host's dial-in modem.

 You hear the number being dialed, the phone ringing, and the host answer through the speaker in your personal computer. When the modem detects the host data tone, the words CONNECTED are displayed on your screen.

6. Press Enter. The UNIX host identification and log-in banner should appear.

7. Continue with the RS-232 log-in sequence described in Chapter 2.

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Establishing a Terminal Emulation Session

When you log in to a terminal emulation session from a host file services session, you do not need to re-establish the modem connection. Simply choose PCI-RS232 Port as your connection path, and log-in as described in Chapter 3.

The following procedure illustrates logging in to a terminal emulation session when you do not have an existing host file services session.

1. Boot your personal computer using your PC-Interface disk.

2. Log in to PC-Interface by typing the EM command.

3. Choose the COM1 connection path.

4. On the Change Parameters menu, choose the communication parameters and baud rate appropriate for your modem. The internal Hayes Smartmodem uses 1200 baud and the default values for the remaining parameters.

5. When the terminal emulation screen appears, it remains blank. Establish the telephone connection to your UNIX host.

 With the Hayes Smartmodem, type:

 `AT DT` ***number***

 where ***number*** is the telephone number of your UNIX host's dial-in modem.

 You hear the number being dialed, the phone ringing, and the host answer through the speaker in your personal computer. When the modem detects the host data tone,

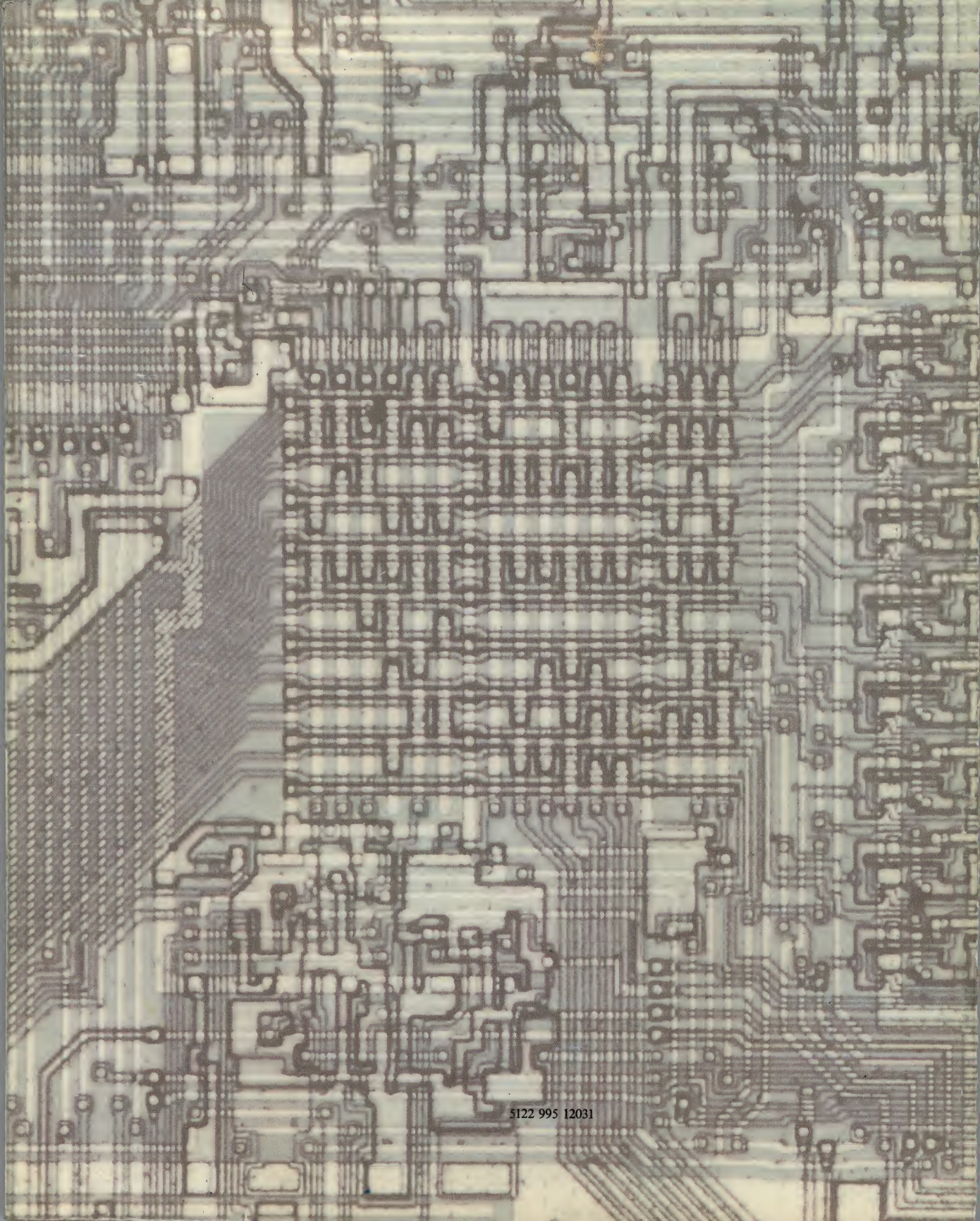
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the words CONNECTED are displayed on your screen.

6. Press Enter. The UNIX host identification and log-in banner should appear.

7. Log in to the UNIX host and continue with your terminal emulation session as described in Chapter 3.

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